

# **NATURAL RESOURCES**

## **PLANT LIFE**

**Folsom Lake State Recreation Area**

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**by**

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# PLANT LIFE

## **Introduction**

This section describes and maps vegetation resources within the Folsom Lake State Recreation (the Unit). Preparation of this section entailed four major tasks: (1) initial information gathering, (2) aerial photographic interpretation, (3) field mapping for ground-truthing of vegetation communities, and (4) data analysis and recommendations. All work was conducted between July and October 2002.

For the first task, the study team reviewed a wide range of information sources, as follows: California Department of Parks and Recreation (CDPR) 1978a, 1978b, 1978c, 1979, 1988, 1996; El Dorado County 2000; Jones and Stokes 1994a, 1994b, 1994c, 1995, 1996, 2001a, 2001b, 2001c; Placer County Water Agency 2002; Quinn et al. 1991; Rhodes and Bowcutt 1994; and U.S. Army Corps of Engineers (ACOE) 1991a, 199b, 1996a, 1996b, 2001a, 2001b; Bureau of Reclamation (BOR) 1988a, 1988b. The team also consulted with the following persons having knowledge and expertise on the Unit: Ken Davis, Consultant; Sandi Richerson, Ecologist, BOR; Peter Warner, CDPR Mendocino District; Sally Walters, CDPR Gold Field District; Gary Fregien, CDPR; Jim Barry, CDPR; Brian Deason, BOR; Mike Healy, California Department of Fish and Game (CDFG); and Todd Keeler-Wolf, CDFG.

The project team also became familiar with special status plant species that might occur in or around the Unit. The study team consulted both the *California Natural Diversity Data Base* (CNDDB 2003) and the California Native Plant Society *Inventory of Rare and Endangered Plants* (CNPS 2001), and visited the Pine Hill Preserve, which is adjacent to the Unit, to become familiar with special status species occurring within the preserve. The unique soils that characterize the Pine Hill Preserve also occur in small portions of the Unit, increasing the possibility that similar special status species might also occur in the Unit.

The second task (*aerial photographic interpretation*) entailed analysis of aerial photographs (preliminary base map: Year 2000, scale: 1: 700) and preliminary mapping of vegetation communities. Plant community boundaries were delineated on aerial photographic field maps, based on previous vegetation maps for the areas and on an initial ground-truthing site visit to preliminarily identify aerial photographic vegetation signatures.

For the third task (*field mapping*), biologists from the study team surveyed the Unit to authenticate and modify the preliminary vegetation maps as needed. The entire extent of the Unit adjacent to Folsom Lake and both forks of the American River were surveyed from the water. Walking surveys were conducted in representative areas of the Unit not accessible by water (including Lake Natoma).

Field surveys were performed on July 16, 17, 18, 19, August 20, 21, September 9, and October 17, 2002, and January 22, 2003. During the field surveys, biologists made observations and collected data on each plant community, as follows:

1. A list of all observed plant species was compiled for each community.

2. Community boundary adjustments were made on the preliminary vegetation maps where needed.
3. Significant vegetation stands were noted on the maps and their locations recorded using a Global Positioning System (GPS) receiver. Significant vegetation stands included native grassland stands, vernal pools, seasonal wetlands and invasive exotic plant infestations.
4. General (non-quantitative) observations were made for each plant community including vegetation dominance, structure (*e.g.*, stand layers, approximate canopy height, canopy and shrub layer density, ground cover), and evidence of past disturbances (*e.g.*, fire, clearing, erosion, invasive exotic plant presence).
5. Although focused surveys for special status species were not conducted, biologists visited specific plant communities likely to support special status species.

The data collected during the vegetation field surveys resulted in a final vegetation community map that constitutes one of the data layers in the project's GIS. The vegetation layer consists of a complex mosaic of vegetation community type polygons for the entire Unit. When these polygons are combined with the other data layers in the GIS (*e.g.*, soils, topography, slope), vegetation data can be viewed in a manner consistent with the California Native Plant Society *Vegetation Rapid Assessment Protocol* (CNPS 2001).

Investigation of aquatic plants in the Unit relied upon interviews with experts currently involved in aquatic weed eradication efforts in the area, as well as limited field surveys of areas known or likely to be support aquatic vegetation. Consultant, Ken Davis, and Bureau of Reclamation (BOR) ecologist, Sandi Richerson, were the primary sources of information on this topic. Additional agency personnel interviewed on this topic included: Peter Warner of the Mendocino District, Sally Walters of the Gold Field District, Folsom Lake State Recreation Area; Brian Deason of the BOR; and Mike Healy of CDFG.

The fourth task (*data analysis and recommendations*) entailed preparation of detailed vegetation community descriptions, species lists and the final vegetation maps which are layered upon an aerial photographic base map, dated 1992, scale 1:700). The task also entailed description of observed and potential vegetation management needs based on field observations by the project team and consultations with Unit staff. Extensive input was also received from fire ecologist Maria Morales, who is preparing a "Unit Burn Plan" for Folsom Lake State Recreation Area. Ms. Morales' plan is based on fuels data and assessment collected from throughout the Unit.

## **Terrestrial Vegetation**

### **Overview**

The Unit is dominated by aquatic habitat within Folsom Lake and Lake Natoma. Nevertheless, the boundaries of the Unit also encompass significant stands of terrestrial vegetation that surround the lakes. The Unit supports many fine examples of native plant communities that provide suitable habitat for a large number of native fauna, and also provide excellent interpretive opportunities for visitors from nearby urban areas.

The Unit supports nine major terrestrial vegetation communities that are typical of the lower foothills of California's Central Valley (Barbour and Major 1977, Sawyer/Keeler-Wolf 1995). These are chamise chaparral, interior live oak woodland, blue oak woodland and savanna, annual grassland, cottonwood/willow riparian, freshwater marsh, seasonal wetland and northern claypan/hardpan vernal pool.

The Unit's plant communities occur in a distinctive pattern that reflects topography, soils and aspect (topographic position). The boundaries between some plant communities are distinct, such that a person can literally step from one type into another (e.g., riparian/grassland boundaries). For other plant communities, the boundaries are gradual transitional zones that are defined only by a gradual decrease in the density of tree canopy (e.g., oak savanna/grassland boundaries).

The Unit's mix of vegetation communities is a product of complex interactions of natural and human influences that have shaped the region. These influences include climate, soil type and depth, elevation, slope, aspect (topographic position), grazing and browsing, fire, physical disturbances by humans, reservoir fluctuations and invasive exotic vegetation. Successful long-term protection and management of the Unit's vegetation must take into account the relationship of the vegetation to physical, environmental and human influences, and how the vegetation responds to changes in these influences.

All of the Unit's plant communities have been significantly influenced by human activities, to varying degrees. For example, most of the Unit's annual grasslands are highly disturbed and bear little resemblance to the native perennial grasslands that they replaced. Grassland disturbance occurred in two major waves. The first wave occurred approximately two-hundred years ago when Europeans introduced livestock grazing to the region. The introduction of cattle, and the associated introduction of European annual grasses as forage, forever altered the grassland landscape. Prior to the introduction of cattle, the Unit would have contained substantial zones of native perennial grassland ecosystems, adapted to brief but intensive periods of grazing by tule elk and pronghorn. These native ecosystems have been replaced by Mediterranean annual grasslands, more suited to extended grazing by cattle.

The second wave of grassland disturbance occurred during the past century with the introduction of aggressive exotic pest plants, such as yellow starthistle (*Centaurea solstitialis*), medusa head (*Taeniatherum caput-medusae*), mustard (*Brassica nigra*) and wild radish (*Raphanus sativus*). Improper grassland management and/or lack of management have almost certainly contributed to the continued spread of these weeds in many locations in California. These noxious weeds are now the dominant species in many grasslands in the Unit.

Woodland and chaparral communities throughout the Unit are adapted to natural cycles of fire and grazing/browsing. Human disturbances, such as fire suppression and cattle grazing activities (prior to Unit establishment) have affected the location, density and composition of these vegetation communities. The hydrology of wetland and riparian areas has been changed by various land alteration activities as well as changes in groundwater regimes caused by the creation of Folsom Lake and Lake Natoma. New wetland and riparian plant communities have developed along the shorelines of the lakes and in former upland areas that became subject to annual water level fluctuations.

## **Vegetation Classification**

The Unit is located within the California Floristic Province (Hickman 1993). This Province extends west from the crests of the Sierra Nevada and Cascade Mountains to the Pacific Ocean and excludes the California deserts (Barbour and Major 1977; Hickman 1993). Because of its great plant and habitat diversity, the California Floristic Province is divided into six regions and 17 subregions (Hickman 1993). The Unit occurs in the transition zone between 2 vegetative subregions. Lake Natoma is located entirely within the Sacramento Valley subregion in the wetter, northern portion of the Great Central Valley region. Folsom Lake is located in the northern Sierra Nevada Foothills subregion.

Elevations in Folsom Lake SRA range from approximately 100 feet to 1,500 feet (see Geology Section). Table PL-1 summarizes the elevation ranges of the Unit's plant communities.

Plant communities in the Unit are described primarily in accordance with the Sawyer and Keeler-Wolf (1995) terrestrial vegetation classification system. The Holland (1986) vegetation classification system is also referenced. The Holland system was used by the California Natural Diversity Data Base (CNDDB) until October 2000 when it was replaced by the Sawyer/Keeler-Wolf system, which is also integrated into the CNPS *Vegetation Rapid Assessment Protocol* (CNPS 2001).

The Holland system is based on a classification approach developed by Cheatham and Haller (1975) which divided the California landscape into 375 natural communities. Each community is easily distinguished from the others because several species are more or less restricted to it, including at least a few dominant species or characteristic indicator species.

Under the Sawyer/Keeler-Wolf system, major vegetation types constitute one hierarchical level based on broad characterizations of dominance (e.g., shrublands, woodlands). Natural plant alliances or "series," constitute the next level in the classification scheme. Series are identified by the dominant plant species that occur in the overstory or dominant height stratum (e.g., chamise series, blue oak series). Series can be further divided into plant associations, which are determined by the characteristic sub-dominant species or by the species that are dominant in the understory (e.g., chamise-white sage association, blue oak/grass association).

The Sawyer/Keeler-Wolf system divides California vegetation into 241 herb, shrub or tree dominated series. Additionally, unique vegetation that cannot be classified into series are identified in several non-series categories of habitats, stands, and vernal pool types.

Wherever possible, this report provides the most appropriate Sawyer/Keeler-Wolf series or non-series name in describing each vegetation community in the Unit. However, the specific names used to identify each vegetation community are not necessarily identical to the Sawyer/Keeler-Wolf series names. This was done for two reasons. First, many of the Sawyer/Keeler-Wolf series names do not always convey to the non-technical reader a clear picture of the appearance of a vegetation community. For example, the term "blue oak woodland and savanna" used in this report provides a better understanding of this particular community than does the term "blue oak series" used under the Sawyer/Keeler-Wolf system.

Second, the Unit contains some vegetation communities (e.g., seasonal wetlands, lake shoreline fluctuation zone) that do not have analogs in the Sawyer/Keeler-Wolf system. In these instances, assigning a Sawyer/Keeler-Wolf series or non-series name would be misleading.

Table PL-1 summarizes the Unit's plant communities with respect to classification, dominant species, elevation range and approximate acreage. Each community is described in more detail in the following sections.

### Chamise Chaparral

*General Description.* The chamise chaparral community found in the Unit is classified as "chamise series" under the Sawyer/Keeler-Wolf classification system. Chamise chaparral is one of over 40 chaparral series designations under the Sawyer/Keeler-Wolf system, approximately 15 of which recognize chamise as a dominant species and corresponds to the "chamise chaparral" and "gabbroic northern mixed chaparral" community types of Holland (1986). Chamise chaparral is dominated by chamise (*Adenostema fasciculatum*), an evergreen shrub that accounts for greater than 60 percent of the vegetative cover. In most instances, associated species contribute less than 10 percent of the canopy cover (Hanes 1990).

Chamise chaparral is the most common type of chaparral in California. In turn, chaparral is the most common vegetative type in California, occurring on dry slopes on the islands, near the coast, and in mountains. Chamise chaparral requires a Mediterranean climate with limited winter rainfall (30-60 cm) and hot dry summers (Hanes 1990). It flourishes on thin, nutrient poor, rocky soils and, in northern California, is sometimes found on serpentine soils. Chamise chaparral occurs between 300 and 3,000 meters elevation on xeric south and west-facing slopes.

*Appearance.* Chamise is 1-3 meters tall at maturity and forms dense interwoven thickets that are difficult to walk through. Chamise looks gray from a distance, both because of the color of the small leaves, and because of the many dead branches and shredding bark of the bushes (Figure PL-1). Chamise chaparral has little understory and litter relative to other types of chaparral due in large part to allelopathic substances (toxins) produced by the chamise leaves (Hanes 1990).

*Characteristic Plant Species.* In the Unit, chamise constitutes approximately 90 percent of the vegetative cover in the almost continuous shrub canopy. Foothill pine (*Pinus sabiniana*) and manzanita (*Arctostaphylos viscida*) are occasionally observed in small numbers above the chamise. Sage (*Salvia sonomensis*) is the dominant ground cover with foxtail chess (*Bromus madritensis*) and foothill needlegrass (*Nassella lepida*) occurring as subdominants. Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence within the Unit.* Chamise chaparral is distributed across approximately 450 acres of the Unit and occurs primarily along the steep south- and southwestern-facing rock outcrops bordering the upper reaches of the American River's South Fork (Figure PL-2). These stands are an extension of a large mantle of chamise that continues almost unbroken for miles to the southeast of the South Fork. Another large stand of chamise occurs on the



Peninsula along the crest and southwestern slope of Flagstaff Hill. Finger-like extensions of this shrubland cover steep east- and south-facing slopes of the Unit portions of the Peninsula. Small (<10 acre) stands of chamise also occur at the extreme southern tips of the Peninsula on moderate slopes. Additional small (<5 acres) stands of chamise occur immediately north of Beek's Bight at the base of the North Fork of the American River.

In the Unit, chamise chaparral occurs on two basic soil types (see Figure 5-1 in the *Soils* Section). The first soil type, that occurs primarily along the upper reaches of the South Fork of the American River, is part of the Rescue soil series, that consists of well-drained soils derived from underlying gabbrodiorite rock formations (SCS 1974). This soil series typically occurs at elevations ranging from 1,000 to 2,500 feet. The specific soil type common to the chamise stands described above is Rescue, extremely stony sandy loam, that occurs on 3 to 50% slopes. The soil is only 3 to 8 inches deep and is easily eroded. The second soil type, that occurs on north and south sides of the South Fork in the vicinity of Iron Mountain and Flagstaff Hill, is a serpentine soil. Stone outcrops constitute 50 to 90 percent of the ground between areas of very thin infertile red soil. Serpentine soils have high levels of magnesium, nickel and chromium (toxic to most plants) and are low in calcium, nitrogen and phosphorous (Pavlik *et al.* 1991).

Probably the best example of this mix of gabbroic and serpentine soil types in the vicinity of the Unit occurs in the Pine Hill Ecological Preserve, located approximately 4 miles southeast of the South Fork of the American River. The preserve supports extensive stands of chamise chaparral containing several federally-listed endangered plant species that are adapted to these unique soil conditions (see discussion below).

*Associated Special Status Plant Species.* Eleven special status species have the potential to occur in the Unit in chaparral habitats on gabbroic or serpentine soils, as follows:

Plant species listed under the Federal and/or State Endangered Species Acts:<sup>1</sup>

- Stebbin's morning glory (*Calystegia stebbinsii*) – FE, SE<sup>2</sup>
- Pine Hill ceanothus (*Ceanothus roderickii*) – FE, SR<sup>3</sup>
- Pine Hill flannelbush (*Fremontodendron decumbens*) – FE, SR
- Eldorado bedstraw (*Galium californicum ssp. sierrae*) – FE, SR
- Layne's ragwort (*Senecio layneae*) – FT,<sup>4</sup> SR

Other special status plant species listed by the State of California or California Native Plant Society are the following:<sup>5</sup>

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<sup>1</sup> The section entitled, Special Status Plants, (page PL-25) and Table PL-2 provide details on the where each special status plant species is known to occur in the Folsom Lake unit vicinity, as well as the habitat requirements and exact listing status of each species.

<sup>2</sup> FE = listed as Endangered under the federal Endangered Species Act; SE = listed as Endangered under the State Endangered Species Act.

<sup>3</sup> SR = listed as Rare by the State of California

<sup>4</sup> FT = listed as Threatened under the federal Endangered Species Act.

- Bisbee Peak rush rose (*Helianthemum suffrutescens*) - 3
- Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeae*) - 1B
- Butte County fritillary (*Fritillaria eastwoodiae*) - 3
- El Dorado County mule ears (*Wyethia reticulata*) - 1B
- Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) - 1B
- Red Hills soaproot (*Chlorogalum grandiflorum*) - 1B

Although these species tend to occur in mixed chaparral communities, the chamise chaparral found in the Unit occurs on similar soil in the upper reaches of the South Fork of the American River as does mixed chaparral. Table PL-3 provides information on special status plant species known or with the potential to occur in the Unit.

*Management Considerations.* Fire is the primary influence in sustaining chaparral communities. Chaparral is prone to frequent fires, and the species that evolved in this community did so under the influence of fire. In areas where fire is not suppressed, chaparral burns on a 10 to 40 year cycle (Muller *et al.* 1968). After a burn, chamise chaparral is slow to regrow relative to other chaparral types, due mainly to the poor soils on which it occurs (Hanes 1990). After a fire, pioneering forbs establish quickly from an extensive seedbank, only to be suppressed by grasses after 4 to 5 years. After 7 to 9 years, the shrubby component has regrown from seed or resprouting (Hanes 1990). Chamise chaparral cannot perpetuate itself in the absence of fire, as fire appears necessary to rid the soil of toxins produced by the chamise (Hanes 1971). If fire is suppressed for many years, openings created by dead chamise will be filled with grasses.

For thousands of years prior to the arrival of Europeans, chaparral burns were regularly set by Native Americans. Spaniards and the settlers that followed also routinely burned chaparral (Hanes 1990). This burning most likely had the long-term effect of perpetuating and expanding chaparral communities, although the short-term goal was to open the shrubland. The suppression of fire in chaparral communities has created senescent stands of chamise that, if unburned, give way to grasslands. Additionally, the lack of fire for long periods of time allows for the accumulation of fuel that, when ignited, results in fires hot enough to sterilize seeds in the seedbank and kill the root-crown burl from which shrubs regrow. In this scenario, the thin soils are exposed to erosion forces that can quickly strip away the soil. In either case, long-term fire suppression results in the eventual loss of the chaparral community.

Grazing and browsing have not played a significant role in the chamise community. Chamise is woody, occurs on steep slopes and grows in dense thickets, making it both an unpalatable food source for cattle and difficult to access.

Chaparral is a highly valued watershed cover, preventing surface erosion on thin soils where little else will grow (Barbour and Major 1977). Chamise chaparral is of particular value in

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<sup>5</sup> CNPS special status plant categories are described on Page PL-25.

the Unit because the steep slopes on which it occurs are exceedingly predisposed to erosion (SCS 1974).

The potential for chaparral to support the federally-listed endangered plant species discussed above is directly related to the unique gabbroic and serpentine soil types that occur there. Disruption of these soils by ground disturbing activities could create soil conditions unfavorable to these species (BOR 2002).

### Interior Live Oak Woodland

*General Description.* This plant community is classified as “interior live oak series” under the Sawyer/Keeler-Wolf classification system. Holland (1986) also identifies a similarly described community as “interior live oak woodland.” Interior live oak (*Quercus wislizenii*) is the sole or dominant tree in the canopy. However, based on the sub-dominance by foothill pine and blue oak in many locations in the Unit, the community may also be described under the Sawyer/Keeler-Wolf system as “interior live oak-blue oak-foothill pine association.”

Interior live oak woodland is unique to California because the dominant and subdominant woody species are all California natives. It extends through the North Coast range and the western slopes of the Sierra foothills, occurring as savanna or woodlands on slopes and in valleys on shallow well-drained soils (Sawyer & Keeler-Wolf 1995). At higher elevations (typically below 5,000 feet) on north aspects, canopy cover tends to increase (Griffin 1990, Pavlik *et al.* 1991). Interior live oak is not restricted to a particular type of soil, although it does not occur on serpentine (Pavlik *et al.* 1991).

*Appearance.* The interior live oak canopy varies substantially. In most locations, the canopy is near-continuous, while in some areas it may have a more open woodland appearance (Figure PL-3). Scattered foothill pines extend above the oak canopy in both closed and open woodlands. Where the upper canopy is dense, shrubs are common in the understory but the groundcover is sparse. Where the upper canopy is more open, shrubs are less common and grasses dominate the groundcover. The interior live oak series intergrades with blue oak series.

*Characteristic Plant Species.* In addition to the evergreen interior live oak, the canopy includes sub-dominants foothill pine, black oak (*Quercus kelloggii*) and blue oak (*Quercus douglasii*). The shrub layer in the Unit is dominated by poison oak (*Toxicodendron diversilobum*) and California buckeye (*Aesculus californica*), while the understory is dominated by blue wild rye (*Elymus glaucus*), hedgehog dogtail (*Cynosurus echinatus*) and ripgut brome (*Bromus diandrus*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence within the Unit.* Interior live oak woodland is distributed across approximately 3,890 acres of the Unit and is the most common community type (by relative cover) in the Unit (Figures PL-4a and PL-4b). A good example of this community type is found north of Granite Bay, where it occurs in an elevation range of 500 to 700 feet in hilly terrain with multiple slope aspects. The soil series on which it occurs is the Andregg-Rock outcrop complex, a moderately deep, well-drained soil type that developed from granitic parent material on 5 to 30 percent slopes (SCS 1980). Here interior live oak is clearly the most dominant tree in the overstory.

On the western and eastern margins of the Peninsula, the blue oak component of the canopy increases such that it becomes co-dominant with interior live oak before transitioning to a separate blue oak community (described below). In the center of the Peninsula and along the length of the South Fork of the American River, foothill pine cover is notably greater than in interior live oak stands elsewhere in the Unit.

The variation in abundance of the three most common canopy species appears to correspond roughly with soil descriptions for the area. Where blue oak is a significant component of the canopy, the soil is described as an Ahwahnee course sandy loam on 9-15% slopes and Auburn very rocky silt loam on 30-50% slopes (SCS 1974, 1980). These soils are very well drained, favoring the more drought tolerant blue oaks. Where the foothill pine becomes co-dominant, the most common soil type is Auburn very rocky silt loam on 2-30% slopes.

*Associated Special Status Plant Species.* Fourteen special status species have the potential to occur in the Unit in interior live oak woodlands, as listed below. Most of these species are primarily associated with chaparral communities, but nevertheless may also occur within oak woodlands where inclusions of gabbroic or serpentine soils are found. Some species may also occur where red clay soils of the Pine Hill formation are found (see Figures 5-1 in *Soils* Section). Big-scale balsamroot, Tuolumne button-celery, and dubious pea are limited to oak woodland sites where deeper, more mesic soils are found.

Plant species listed under the Federal and/or State Endangered Species Acts:

- Eldorado bedstraw (*Galium californicum* ssp. *sierrae*) – FE, SR
- Stebbin’s morning glory (*Calystegia stebbinsi*) – FE, SE
- Pine Hill ceanothus (*Ceanothus roderickii*) – FE, SR
- Pine Hill flannelbush (*Fremontodendron decumbens*) – FE, SR
- Layne’s ragwort (*Senecio layneae*) – FT, SR

Other special status plant species listed by the State of California or California Native Plant Society are the following:

- Bisbee Peak rush rose (*Helianthemum suffrutescens*) - 3
- Brandegee’s clarkia (*Clarkia biloba* ssp. *brandegeae*) - 1B
- Butte County fritillary (*Fritillaria eastwoodiae*) - 3
- El Dorado County mule ears (*Wyethia reticulata*) - 1B
- Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) - 1B
- Red Hills soaproot (*Chlorogalum grandiflorum*) - 1B
- Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) - 1B
- Tuolumne button-celery (*Eryngium pinnatisectum*) - 1B

- Dubious pea (*Lathyrus sulphureus* var. *argillaceus*) - 3

Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* In general, fire thins the understory of interior live oak woodlands, and regular fires will create a more savanna-like structure. Range improvement efforts to reduce woody vegetation and human-set fires have opened oak woodlands. Grazing has limited re-growth in oak woodlands throughout California.

Where fire and grazing are infrequent, the live oak and shrub component of interior live oak woodlands will increase (Griffin 1990). Regular low-intensity fires will favor blue oaks over interior live oaks as the blue oak component of the community is more fire adapted than interior live oak. Mature blue oaks will survive fires that kill the above-ground portions of interior live oak, although interior live oak can resprout from the base. Foothill pine saplings are very sensitive to fire (Griffin 1990). This suggests that regular fires would have the effect of reducing the regeneration of foothill pine in the interior live oak woodlands.

### Blue Oak Woodland and Savanna

*General Description.* The blue oak woodland and savanna community is classified as “blue oak series” under the Sawyer/Keeler-Wolf classification system and “blue oak woodland” under the Holland system. It encompasses a continuum of cover types in which the dominant species is blue oak, ranging from dense canopy woodland to open canopy savanna. Where savanna predominates, this community may be classified under the Sawyer/Keeler-Wolf system as “blue oak/annual grass association.”

Blue oaks occur only in California and commonly below 3,500 feet in the foothills surrounding the Central Valley, as well as the inner Coastal Ranges. Blue oaks are extremely drought tolerant and can thrive in regions with as little as 15 inches of annual rainfall (Pavlik *et al.* 1991). In such areas they tend to grow as scattered trees in oak savannas. Where soil moisture increases or on cooler north facing slopes, oak savannas transition into denser woodlands that support more species. The predominance of oak woodland in comparison to oak savanna at the Unit probably reflects such higher moisture conditions.

*Appearance.* Blue oak woodland and savanna communities can be readily identified due to the distinctive appearance of their dominant species. The deciduous leaves of blue oaks have a blue-green color that gives the blue oak its name. Canopy cover varies from closed woodland (greater than 30 percent cover) to open savanna. An open shrub layer will establish under closed canopy blue oak woodlands. Mature trees can grow to 60 feet with diameters of up to two feet (Pavlik 1991). Blue oak savannas are typically composed solely of blue oaks in the open canopy with little or no shrubby understory. In blue oak woodlands, the canopy includes blue oak as the dominant tree with interior live oak and foothill pine as occasional subdominants. Like the savanna, blue oak woodlands have very little understory. The majority of small trees that occur under the canopy are blue oak saplings giving blue oak woodlands, as well as blue oak savannas, an open park-like appearance (Figures PL-5 and PL-6).

*Characteristic Plant Species.* Blue oaks tend to be the dominant or sole canopy species. The dominant plants in the grassy understory tend to vary with canopy density. Hedgehog dogtail grass usually dominates in the shadiest spots and is associated with the invasive

exotic species, Italian thistle (*Carduus pycnocephalus*). In less shady locations, wild oats (*Avena fatua*) or ripgut brome dominate in association with soft chess (*Bromus hordeaceus*) or rose clover (*Trifolium hirtum*).

The understory contains some notable native plant species in the Unit. Individual clones (tussocks comprised of a single plant) of deergrass (*Muhlenbergia rigens*) and purple needlegrass (*Nassella pulchra*) occur occasionally under open blue oak woodland. Where the canopy is more dense, creating deep shade, or in open savanna where non-native annual grasses predominate, the native grasses drop out. A 75 foot by 200 foot stand of native deergrass occurs on the Peninsula at the base of the South Fork of the American River (see vegetation maps). It extends along a moist drainage at the edge of blue oak woodland and open grassland. The stand is currently monitored for the purpose of documenting stand persistence and clone regeneration after fire (Jim Barry, CDPR, *pers. com.*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence within the Unit.* Blue oak woodland and savanna community is distributed across approximately 1,930 acres of the Unit and is second only to interior live oak woodland in the amount of acreage covered within the Unit (Figures PL-7a and PL-7b). The largest unbroken stands are found on the Peninsula on well-drained, sandy or rocky soil. Additional blue oak woodlands and savannas occur along the lower portion of the South Fork of the American River and in scattered patches around the body of the reservoir.

*Associated Special Status Plant Species.* Special status species that have the potential to occur in blue oak woodland are the same as those discussed for the interior live oak community series, above. Few, if any, of the listed species are likely to occur in blue oak savanna. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Maintenance of blue oak woodland and savanna is dependent on disturbance regimes associated with grazing and/or fire. Under heavy grazing or browsing, blue oak savannas will usually transition to grasslands, particularly after a high intensity fire that damages mature oaks. However, regular moderate fire and/or moderate grazing will tend to maintain the savanna community. Where soil moisture is moderate to high or where fire does not regularly occur, a denser blue oak woodland will develop, which is generally the case in the Unit.

Blue oak savannas on shallow soils with a south aspect are likely to persist without developing an understory, regardless of disturbance regime, since such physical conditions do not promote the development of woodland characteristics (Griffin 1990).

Depending on environmental conditions such as fire frequency, grazing intensity, and the nature of human impacts, successional changes can occur at different rates. In dry areas, like California's foothills, succession will proceed more slowly. Human-set fires prior to the 1900s and historic range improvement efforts were large-scale disturbances that opened oak woodlands throughout California (Griffin 1990). Despite fire suppression policies in the last half-century, several studies (Griffin 1971, Muick and Amme 1990) indicate that regeneration rates for deciduous oaks, including the blue oak, have been particularly low in the last 70 years in California. The low levels of reproduction have been attributed to acorn damage caused by cattle grazing, deer browsing, and insect and rodent herbivory.

## California Annual Grassland

*General Description.* This community type is identified by Sawyer/Keeler-Wolf as the “California annual grassland series.” Holland identifies the community as “valley and foothill grassland” or “non-native grassland.”

Originally, grassland probably covered well-drained areas in California from sea level to approximately 3,600 feet in elevation (Barbour and Major 1990). Grasslands ringed the Central Valley and were dotted along the coast. Purple needlegrass is thought to have been the dominant grass of pristine valley grasslands (Barbour and Major 1990). Since then, non-native annual grasses and forbs have come to dominate the region’s grasslands as they have elsewhere in California. Human introduction of non-native plants into California began with the European settlements in the 18<sup>th</sup> century and continues today.

With a few notable exceptions (see below), all of the grassland areas in the Unit can be classified as non-native because they have an insignificant amount of native grass cover, and are overwhelmingly dominated by non-native annual grass species. Because exotic annual grasses are so abundant and native grasses so rare throughout the state, the California Department of Fish and Game has defined “native grassland” as having a minimum of 10 percent cover of native grass species (Todd Keeler-Wolf, *pers. com.*). Very few grassland areas in the Unit meet even this minimal definition.

*Appearance.* Annual grassland is typically composed of a dense cover of annual grasses and broadleaved plants (forbs) adapted to colonizing and persisting in disturbed areas (Figure PL-8 and PL-9). The height of the vegetation is approximately three feet. An occasional blue oak intrudes into the grasslands of the Unit, which are defined as having less than 10 percent tree canopy cover (Barbour and Major 1990).<sup>6</sup>

*Characteristic Plant Species.* The dominant grasses in this community are brachypodium (*Brachypodium distachyon*), ripgut brome, soft chess brome and wild oats (*Avena fatua*). Although this community is dominated by non-native species, native grasses and wildflowers are present in varying degrees. Invasive exotic pest plants, primarily yellow starthistle (*Centaurea solstitialis*), medusa head (*Taeniatherum caput-medusae*) and mustard (*Brassica nigra*) are common associates. Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in Folsom Lake Unit.* Annual grassland is distributed across approximately 1,120 acres of the Unit and is the third most abundant cover type in the Unit after interior live oak and blue oak woodlands (Figures PL-10a and PL-10b). It is found in low areas around the margins of the reservoir, along drainages, and on some arid ridgetops. Additionally, patches of grassland occur in the Peninsula where clearing (presumably for grazing) has opened the interior live oak woodland canopy.

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<sup>6</sup> Grasslands are defined as having less than 10 percent tree canopy cover; savanna has 10-30 percent tree canopy cover; and woodland has over 30 percent tree canopy cover (Barbour and Major 1990). Holland’s community classification system is also noted parenthetically for comparison (Holland 1986). Specific vegetation series are described below.

Many grassland areas of the park are notable for their high proportion of the invasive non-native weed, yellow starthistle. The primary exceptions to this are grasslands on the Peninsula where starthistle invasion is still at relatively low levels. Yellow starthistle is more commonly found in disturbed areas. The highest levels of starthistle invasion are found in the grasslands along roads, trails, around picnic areas and camp sites, and near mine shaft openings. With the exception of two fairly large grasslands in the Peninsula where low to no starthistle was detected, all of the remaining grasslands within the Unit contain medium to high levels of starthistle. In general, starthistle coverage is higher on the western side of Folsom Lake than elsewhere within the Unit.

Few grassland areas in the Unit support more than a sprinkling of natives. One exception is the 75 foot by 200 foot stand of native deergrass that occurs on the Peninsula at the base of the South Fork of the American River (Figure PL-10a). It extends along a moist drainage at the edge of blue oak woodland and open grassland. The stand is currently monitored by Jim Berry (CDPR) with the purpose of documenting stand persistence and clone regeneration after fire. Purple needle grass makes an occasional appearance in the Unit's grasslands, but contributes less than 1 percent overall cover.

*Associated Special Status Plant Species.* No special status species are endemic to grasslands listed for the region surrounding the Unit. Several species that occur in vernal pools (described more fully in the vernal pool section below) are listed as occurring in grasslands by virtue of the fact that vernal pools are most often found in a grassland matrix. None of these vernal pool species are found outside of the pools in the grassy upland. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Management efforts for grasslands in the Unit should take into account two key concerns, as follows:

1. The lack of grasslands that have even a small component of native grass species contribute to an overall low grassland habitat quality and deprives visitors of the opportunity to view an important component of the region's natural history of the region.
2. The on-going colonization and spread of invasive exotic pest plants, primarily yellow starthistle, is rapidly diminishing the habitat quality of grasslands and associated woodland and savanna areas. Starthistle is also degrading the quality of the visitor's experience because its dense, spiny flower heads render many grasslands hostile and impenetrable for walking. Horseback riding is also difficult where narrow trails pass through dense starthistle stands. Finally, it contributes to the overall fire hazard of grassland areas.

Prior to the introduction of non-native grasses, the grasslands of the Unit were likely characterized by a relatively diverse mix of annual native forbs and grasses. These grasslands were well adapted to the presence of brief but intensive periods of grazing by native ungulates such as tule elk and pronghorn, as well as periodic light fires. The native forb and grass species were well-adapted to initial colonization after fire and grazing, however they eventually gave way to native perennial bunchgrasses, that are slow growing, but better competitors over the long term. The stable self-perpetuating late successional grasslands were probably dominated by purple needlegrass.



This historic relationship of grazing and fire to grasslands is no longer applicable to the Unit. Existing grasslands are a consequence of long-term grazing by livestock and the corresponding introduction of non-native annual species, that were better adapted to heavy livestock grazing than native bunchgrasses (Painter 1995). Livestock grazing patterns differ from the behavior of the native ungulates, and consequently the timing, intensity, and uniformity of herbivory and trampling differs, all conditions that favor the non-native annual grass species.

In the Unit, annual grasslands will gradually undergo transition to blue oak woodlands in the absence of fire. However the nature of the fire regime is very important. Occasional fires will help maintain grasslands, particularly in areas with deeper soils, by preventing young oaks from getting their start. However, light fires may promote the growth of oak savanna and woodland by promoting rapid crown sprouting from seedlings and saplings, by releasing nutrients to the soil and by reducing competition from other plants (Pavlik *et al.* 1991). On the other hand, the lack of regular, low-intensity fires, as a result of fire suppression, can result in excessive fuel accumulation, resulting in severe and damaging wildfires that kill mature oaks.

Prior to establishment of the Unit, cattle grazing probably played a role in helping to prevent transition of annual grasslands to blue oak woodlands through annual consumption of acorns and seedlings as well as browsing of saplings. Deer browsing may continue to play such a role. Deer will consume both grasses and forbs in their early green stages, but concentrate on woody vegetation (oak leaves, acorns) for most of the year (Wagner 1989). Therefore, their role in shaping the vegetation communities at the Unit may help control the invasion of grasslands by oaks through acorn and seedling/sapling consumption. However, whether such browsing by deer at the Unit is significant enough to actually prevent encroachment of blue oak woodland into grasslands is unknown.

Other non-native species occur within the grasslands of the Unit. A large stand of intergrade needlegrass (*Nassella pulchra* x *Nassella formicaria* – an Argentinian species) occurs in a grassy area at the end of Rattlesnake Bar Road, approximately ½ mile past the entrance kiosk for the Peninsula Campground. The stand has been monitored by CDPR to mark its spread. Another stand of the intergrade *Nassella* species is found along the bluff between Willow Creek and Alder Creek on Lake Natoma (Gary Fregien, CDPR *pers. com*). It is unclear how much of a threat this intergrade species represents at this time.

#### Cottonwood/Willow Riparian

*General Description.* The Unit supports two types of riparian communities: “Fremont cottonwood series” and “mixed willow series,” as identified by Sawyer and Keeler-Wolf (1995). The occurrence of these riparian types depends largely upon the permanence of the water source and the level of stream disturbance that has occurred. Holland (1986) refers to these community types as the “Great Valley mixed riparian forest” and the “Great Valley cottonwood riparian forest,” respectively.

Riparian communities occur along river, stream, and creek courses where the presence of water keeps soils moist and therefore supports a vegetational makeup different from the surrounding drier upland areas. Riparian trees and shrubs are tolerant of long periods of surface waters and/or saturated soil conditions along a stream corridor, and also have the ability to tap into deeper zones of soil moisture during the dry season via extended root

systems. Riparian systems occur where steep slopes channel water from spring rains into shallow channels or folds in the topography. Although often dry except for late winter and early spring, the drainages are often more densely vegetated than the surrounding slopes as plants take advantage of seasonal pulses of moisture. Both the Fremont cottonwood series and mixed willow series tend to occur on relatively fine-textured alluvium deposited by seasonal flooding.

*Appearance.* The general appearance of riparian vegetation in the Unit depends on the type of stand and whether it occurs along a perennial or an intermittent seasonal drainage. The canopy of Fremont cottonwood dominated riparian stands in the Unit is typically less than 25 meters in height and may be continuous or open (Sawyer and Keeler-Wolf 1995). Mixed willow riparian stands typically have a canopy that is less than 10 meters in height and the understory is typically sparse (Figure PL-11).

*Characteristic Plant Species.* The vegetation in the Fremont cottonwood series is dominated by Fremont cottonwood (*Populus fremontii*), black willow (*Salix gooddingii*), Northern California black walnut var. *hindsii* (*Juglans californica*), and California ash (*Fraxinus dipetala*). Buttonbush (*Cephalanthus occidentalis*), white alder (*Alnus rhombifolia*), California buckeye (*Aesculus californica*), arroyo willow (*Salix lasiolepis*), and California grape (*Vitis californica*) are common understory species. In contrast, the mixed willow series is dominated by willows including black willow, arroyo willow, and narrowleaf willow (*Salix exigua*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in the Unit.* Cottonwood/willow riparian communities are distributed across approximately 390 acres of the Unit. These communities occur along eight perennial creeks and 22 intermittent streams that empty into Folsom Lake, and along three perennial creeks that enter Lake Natoma (Figures PL-12a and PL-12b). Perennial creeks flow throughout the year. Intermittent streams are small drainages that flow seasonally for extended periods and may receive inflows from both surface run-off and groundwater. The Unit also contains numerous ephemeral streams, that are small drainages that flow for only brief periods following storm events and do not receive groundwater inflows. Ephemeral streams generally do not support riparian vegetation.

Two of the existing perennial creeks feeding into Folsom Lake, New York Creek and Miner's Ravine, were historically intermittent stream systems that now perennially carry irrigation run-off water from developments within their watersheds. Willow Creek, flowing into Lake Natoma also carries a significant amount of irrigation run-off.

Fremont cottonwood stands occur in relatively undisturbed sections of creeks in the Unit. These areas tend to be along the upper reaches of creeks, further away from the lake itself. The three best examples occur along the South Fork of the American River: Sweetwater Creek, Hancock Creek, and Pilot Creek. More disturbed creeks, such as New York Creek, Deep Ravine Creek, Anderson Creek, and Willow Creek, contain similar canopy species, although cottonwood trees are more dominant in the canopy. The understory along these disturbed creeks is choked with the non-native Himalayan blackberry (*Rubus discolor*), and California grape blankets the shrub layer. In several cases, these creeks appear to have once been seasonal streams that have become perennial as a result of run-off from surrounding upstream development.

Mixed willow stands are most commonly observed near the mouth of creeks and drainages adjacent to Folsom Lake and Lake Natoma, and in occasional patches along the shorelines of both lakes. These areas are subject to high seasonal water tables and seasonal flooding during periods of high lake water levels. Willow stands also occur in permanent small ponds, such as those created by mining and dredger tailings on Mississippi Bar.

*Associated Special Status Plant Species.* The single special status plant species occurring in the riparian forests is Northern California black walnut (*Juglans californica* var. *hindsii*), a CNPS List 1B species. However, several creeks and their associated riparian zones occur as narrow strips within larger habitat types such as interior live oak, that could contain the special status plants associated with these habitat types. Additionally, vernal pools sometimes occur in close proximity to riparian areas. Either of these nearby habitats could harbor special status species. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Many of the riparian habitats in the Unit have been disturbed and/or fragmented by inundation from the reservoir, upstream inputs from run-off, stream perennialization, and road crossings. This fragmentation has probably facilitated infestation by invasive exotic plant species, such as Himalayan berry (mentioned above) that grows in dense thickets. Such infestations reduce the diversity of native vegetation along the stream corridors and reduce habitat value accordingly.

### Freshwater Marsh

*General Description.* Freshwater marsh community in the Unit is classified as “cattail series” in Sawyer and Keeler-Wolf. Holland labels this community type as the “coastal and valley freshwater marsh.” The cattail series occurs from sea level to approximately 6,500 feet (2,000 meters) in elevation.

*Appearance.* This community type typically occurs in shallow freshwater depressions and backwater areas along streams where water is slow moving and seldom exceeds three feet in depth (Figure PL-13). It is characterized by dense stands of perennial, emergent marsh vegetation (14.5 to 16 feet /4.5 to 5 meter), such as bulrush (*Scirpus* sp.). Along its edges, dense stands of shorter-statured marsh plants are found, while the interiors may be broken by open patches of water, that often are choked with smartweed (*Polygonum* sp.) and floating pond weeds. The cattail series can tolerate saline waters and will occur in permanently flooded as well as irregularly flooded environments. Peaty organic-rich soils have accumulated under perennially saturated soils.

*Characteristic Plant Species.* In the Unit, marsh vegetation is often dominated by cattails and bulrush, but shorter stature sedges (e.g., *Carex aquatilis*), spikerush (*Eleocharis macrostachya*), and spreading rush (*Juncus patens*) are often found in close association in shallower water. Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in the Unit.* Freshwater marsh is distributed across approximately 10 acres of the Unit. Freshwater marsh was less likely to occur in the Unit prior to European settlement when water in the area traveled through creeks and the American River. Marsh conditions can now be found along the edges of the artificial ponds and slow moving creek sections where they enter the lakes as a result of dam construction (Figures PL-14a, PL-14b). Cattail

marsh is found in patches along the dredge tail ponds of Mississippi Bar, in relatively protected coves along Lake Natoma, along the banks of the larger perennial creeks such as New York Creek and Willow Creek, in ephemeral and seasonal creeks such as Indian Springs and Hancock Creek. Freshwater marsh, dominated by the introduced species, yellow iris (*Iris pseudacorus*), is found along the edges of Avery's Pond. In most cases, freshwater marsh communities along riparian drainages occur in patches too small to show on the base map. Another example of freshwater marsh is found in the Mormon Island Wetland Preserve below the Folsom Dam.

*Associated Special Status Plant Species.* None of the special status species that might occur in the Unit occur in this community type. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* A number of exotic non-native species are known to occur or were observed during field surveys in the freshwater marsh habitats of the Unit. Pampas grass (*Cortaderia selloana*) is a tall (6 – 13 feet) tussock grass that germinates and grows on moist, usually sandy, soils. In the Unit, pampas grass has been observed along the banks of Lake Natoma and bordering many of the dredge tailing ponds along Mississippi Bar. Pampas grass is also known to occur along the lower American River (Bossard, *et al.* 2000).

Yellow iris, an introduced species, occurs in dense stands around the shore of Avery's Pond and at Negro Bar near Natoma Crossing. Like pampas grass, it has escaped from gardens. Scarlet wisteria (*Sesbania punicea*) has recently been reported along the American River Parkway although it was not observed in recent field visits. This shrubby legume is a weed of great concern in the eastern portion of the United States and in other countries where it has invaded. Giant reed grass (*Arundo donax*) is an aggressive invader along riverine systems, and has been observed very close to the Unit (Sandi Richerson, CDPR *pers. com.*). It is expected to soon invade both marsh and stream systems of the Unit.

As with other wetland systems, the successional cycle of a freshwater marsh community is based upon the (usually) cyclical nature of water level increases and draw-downs. Under most circumstances, freshwater marshes do not transition to a different community type. Because the cattail series occurs most often in areas of perennial water in the Unit, the successional cycle may not be yearly as with seasonal wetlands and vernal pools, but may occur over a multi-year period. Typically, existing stands of cattail and bulrush will persist through short seasonal drawdowns. During drawdowns, the moist exposed soil provides germination sites for cattail and bulrush seeds as well as a large number of annual forbs, such as dotted smartweed (*Polygonum punctatum*).

If drawdown conditions persist for more than one growing season, cattail and bulrush clones will die back. Cattails can resprout from dehydrated rhizomes after several years without water. More typically, the return of moist conditions promotes the germination of these species from the seedbank. Deep-water inundation can sometimes result in floating rafts of cattails breaking free and dispersing across lakes or downstream. Deep water also promotes herbivory from muskrats that can remove large stands of cattails and bulrush for their nests. Heavy herbivory and deep water alone can result in the death of cattail and bulrush stands that will return from the seedbank during the next drawdown.

Fire does not play a role in the succession or development of freshwater marsh communities, except in areas where the non-native pampas grass has established dense stands. The thatch

from these large plants is a fire hazard that might serve as an ignition source for nearby upland vegetation communities.

Freshwater marsh community is usually subject to U.S. Army Corps of Engineers jurisdiction under Section 404 of the Clean Water Act, and Regional Water Quality Control Board jurisdiction under Section 410 of the Clean Water Act. The limits of jurisdictional area are defined by the Corps' "three parameter test" which requires that there be (1) a predominance of hydrophytic plant species (*i.e.*, plants that are tolerant of or require extended periods of inundation or soil saturation); (2) evidence of hydric soils (soils with characteristic typical of saturated or ponded conditions for extended periods); and (3) hydrological conditions suggesting extended periods of ponding or soil saturation (Environmental Laboratory 1987).

### Seasonal Wetlands

*General Description.* Seasonal wetlands are wetland habitats that are typically wet in the winter months and dry in the summer. Vernal pools, discussed in the section that follows, are a type of seasonal wetland with unique hydrology and flora. Seasonal wetlands that are not vernal pools are typically distinguished from vernal pools by seasonal inundation that is greater in depth and longer in duration. This difference in hydrology promotes a different suite of moisture-adapted vegetation than vernal pools, although there is some overlap. The vegetation in seasonal wetlands varies greatly by geographic location and hydrology. One result of this diversity is that seasonal wetlands have not been classified by Sawyer and Keeler-Wolf (1995) or Holland (1986). Despite its lack of formal recognition as a unique vegetation community, it provides important habitat for many animals (amphibians and invertebrates in particular – refer to the Animal Life section).

*Appearance.* The vegetation in seasonal wetlands is usually less than three feet in height and is dominated by a wide mix of grasses and forbs (Figure PL-15). The plants in this community are adapted to saturated soils in the winter and can tolerate drought in the summer. Seasonal wetland vegetation is found in isolated basins and along creeks and ephemeral drainages. Consequently, hydrology may be determined by winter rainfall, overbank flooding from adjacent water bodies, and dry season upstream run-off from human activities.

*Characteristic Plant Species.* Seasonal wetlands that experience long periods of flooding or contain deeper water (1-2 feet) develop a plant community dominated by sedges (*Carex* sp. and *Cyperus* sp.), rushes (*Juncus* sp.), and spikerush (*Eleocharis* sp.). Seasonal wetlands with a shorter hydroperiod or shallower water tend to be dominated by moisture-tolerant grasses such as Italian ryegrass (*Lolium multiflorum*) and rabbits-foot grass (*Polypogon monspeliensis*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in the Unit.* Seasonal wetlands are distributed across approximately 3-5 acres of the Unit, occurring primarily along streams (PL-14a and PL-14b). Seasonal wetlands also occur in relatively level or low areas below the high water line of the reservoir where water has ponded briefly following lake level draw-downs and at the mouth of most major drainages feeding into Folsom Lake. By virtue of their small size and patchy distribution, only a few areas are large enough to be shown on the base map.

Larger stands of seasonal wetlands are found in the Mormon Island Wetland Preserve, the Snipes Pershing Park, adjacent to the intergrade purple needlegrass stand near the Peninsula Campground, at the Nimbus Overlook, and in a grassland area west of Folsom Boulevard and south of Willow Creek (southeast side of Lake Natoma). In three of the four sites, the seasonal wetlands occur in close proximity to vernal pool wetland communities. In addition, two significant seasonal wetlands containing a few vernal pool plants are located on Doton's Point along a walking path. These seasonal wetlands are (erroneously) labeled vernal pools on the interpretive signs, but differ from classic vernal pools in the type of vegetation that dominates the basins. The dominant plants in these seasonal wetlands are sedges, rushes, and spikerushes, which are indicative of longer hydroperiods and/or deeper water during the wet season.

*Associated Special Status Plant Species.* Although unlikely because of differences in hydrology, all of the special status species that may occur in vernal pools (discussed below) may also occur in seasonal wetlands. Some overlap in non-special status species occurs in both seasonal wetlands and vernal pools. Seeds or other propagules from special status species could be dispersed from vernal pools into other seasonal wetlands and may persist in small numbers. These species are the following:

Plant species listed under the Federal and/or State Endangered Species Acts:

- Boggs Lake hedge-hyssop (*Gratiola heterosepala*) – SE
- Slender Orcutt grass (*Orcuttia tenuis*) – FE, SE
- Sacramento Orcutt grass (*Orcuttia viscida*) – FE, SE

Other special status plant species listed by the State of California or California Native Plant Society are the following:

- Dwarf downingia (*Downingia pusilla*) - 2
- Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) - 1B
- Legenere (*Legenere limosa*) - 1B
- Pincushion navarretia (*Navarretia myersii* ssp. *myersii*) - 1B

Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Seasonal wetlands in the Unit potentially support a number of introduced plant plants, including pennyroyal (*Mentha pulegium*) and purple loosestrife (*Lythrum hyssopifolium*). Perennial pepperweed, (*Lepidium latifolium*) is an invasive exotic pest plant typically associated with disturbed seasonal wetlands. This prolific seeder can spread quickly if not eradicated and can form dense monocultures to the exclusion of nearly all other species. Pepperweed was not observed in any of the seasonal wetlands visited during field surveys of the Unit, however its occurrence is a strong possibility.

As with other wetland and riparian-associated vegetation communities, seasonal wetlands are subject to a cyclical pattern of succession. Winter inundation and summer drawdowns

maintain a vegetation community tolerant of flooding and saturated soils as well as dry conditions. Seasonal wetlands do not tend to become vernal pools or visa versa as a consequence of hydrology, which is controlled by the permeability of the soil (usually greater in seasonal wetlands) and the topography of the basin, and the length of inundation. Likewise, seasonal wetland communities do not tend to develop into freshwater marsh because the hydrology of freshwater marshes is so much deeper. The exception to this occurs where formerly seasonal or ephemeral creeks become perennial (from upstream augmentation) and former seasonal wetland vegetation along the banks becomes permanently inundated. Here, freshwater marsh species such as cattail begin to displace typical seasonal wetland vegetation.

Seasonal wetlands are subject to the influence of fire by virtue of the fire patterns of surrounding upland communities. Seasonal wetlands are typically small in size and are dry during the fire season, therefore subject to burning. Nonetheless, the amount of fuel seasonal wetlands contribute to a burn is small. Fire is not likely to have an important successional role in the development of seasonal wetland vegetation, although its effects on seasonal wetlands in general have not been investigated.

Seasonal wetlands are usually subject to U.S. Army Corps of Engineers jurisdiction under Section 404 of the Clean Water Act, and Regional Water Quality Control Board jurisdiction under Section 401 of the Clean Water Act. The parameters by which the limits of jurisdictional area can be determined are described above under "Freshwater Marsh."

#### Northern Claypan and Northern Hardpan Vernal Pools

*General Description.* Vernal pools in the Unit are identified by their low herbaceous vegetation of annual hydrophytic species and their soil characteristics that include a shallow impermeable clay layer that forms a water-tight basin. Vernal pools are classified as the "northern claypan vernal pool" and "northern hardpan vernal pool" habitats under the Sawyer/Keeler-Wolf classification system. The Holland classification system identifies these vernal pools based upon the same criteria, and gives them the same name, "northern claypan and hardpan vernal pools."

Vernal pools are shallow wetlands that receive water from winter rain, and occasionally, overland sheet flow. A type of seasonal wetland, vernal pools dry up during the late spring and fill again the following winter. The annual vegetation species in these pools is uniquely adapted to tolerate winter inundation and summer desiccation. The annual forbs and grasses that occur in the bottom of the pools are short in stature (<1 foot) and often sparsely scattered across the pool. Perennial grasses may ring the pools. Trees or shrubs do not occur in vernal pools.

Vernal pools typically occur in relatively flat or gently rolling terrain where they are surrounded by grasslands. The pools may be connected to one another by vernal swales, but more commonly, they are hydrologically isolated. In the summer, it may be difficult to locate vernal pools in a sea of upland grasses. In late spring after water has evaporated from native vernal pools, brilliant yellow, white and purple annual forbs bloom in profusion.

Northern claypan vernal pools occur on "neutral to alkaline, silica-cemented hardpan soils," which are sometimes saline (Sawyer and Keeler-Wolf, 1995). In contrast, northern hardpan vernal pools occur on "acidic, iron-silica cemented soils including Corning, Redding, and

San Joaquin soil series.” The Unit’s vernal pools are situated within mapped soil types (e.g., Auburn/Sobranite, Ahwanhee, Xerolls – alluvial terraces) that are not characterized by cemented or hardpan conditions (see Soils Section). However, the pools may be located upon localized inclusions of such conditions within the larger mapped soil types. It is also possible that previous human activities, such as earthmoving, farming or mining) have created compacted soil conditions in the pool locations that emulate natural hardpan soil types. Both types of vernal pools occur in the Central Valley at elevations lower than 325 feet (100 meters).

*Characteristic Plant Species.* The vegetation in the Unit’s two vernal pool types is, for all practical purposes, identical. In relatively undisturbed pools in the Unit, the early-mid spring vegetation is dominated by native annuals such as Sacramento pogogyne (*Pogogyne ziziphoroides*), vernal pool buttercup (*Ranunculus bonariensis* var. *trisepalus*), threadstem navarretia (*Navarretia filicaulis*), Solano downingia (*Downingia ornatissima*) and slender popcorn flower (*Plagiobotrys stipatus*). In the late spring/early summer, these species give way to annual hairgrass (*Deschampsia danthonioides*), yellow-ray goldfields (*Lasthenia glaberima*), Fremont goldfields (*Lasthenia fremontii*) and coyote thistle (*Eryngium castrense*). Disturbed vernal pools are typically dominated by Italian ryegrass and pennyroyal, with a smattering of the native vernal pools species listed above. Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in the Unit.* An estimated 0.5-2 acres of vernal pools are found in the Unit, occurring in various locations in the vicinity of Lake Natoma and southeast of Folsom Lake (Figures PL-14a and PL-14b). The highest quality wetlands, as defined by vernal pool plant species diversity and abundance, are located at the Nimbus Overlook (southwest end of Lake Natoma) and the Mormon Island Wetland Preserve (southeast of Folsom Lake). At Nimbus Overlook there are two small vernal pools (in addition to seasonal wetlands), each less than 100 square feet in size. The pool locations and the disturbance history for the area suggest that these pools basins are naturally occurring. The Mormon Island Wetland Preserve area was a borrow area for the Folsom Dam construction. The large seasonal wetlands in this area are created features, however the majority of the vernal pools appear to be native based upon their size and location in the undulating landscape. Seven mid-sized vernal pools (all approximately 500 square feet) and six small pools (all less than 100 square feet) were observed here.

Lower quality vernal pools are located near Snowberry Way (northwest of Lake Natoma), west of Folsom Boulevard and south of Willow Creek (southeast side of Lake Natoma), in the Snipes-Pershing Park (northwest side of Lake Natoma), and near Beek’s Bight. The Snowberry Way location supports one large vernal pool (approximately 14,000 square feet), that appears to receive run-off from neighboring yards during the winter. The pool has low vegetative cover and is being shaded out by eucalyptus trees, but nevertheless contains several native vernal pool species (annual hairgrass and Fremont goldfields).

Four vernal pools and one deeper wetland feature were observed west of Folsom Boulevard and south of Willow Creek. The bottoms of these vernal pools are lined with cobble and the vegetation in three of the four suggests a very short hydroperiod, that is likely due to pool drainage. These three pools may have been physically or hydrologically altered as a result of soil movement in the area. The fourth pool appears to be less altered and contains small quantities of native vernal pool species.



Four vernal pools and three seasonal wetlands were observed at the Snipes-Pershing Park. These pools are native to the site, but are dominated by non-native vegetation (primarily Italian ryegrass) indicative of site disturbance.

*Associated Special Status Plant Species.* Special status species that may occur within the vernal pools of the Unit are the same as those described above for the seasonal wetland community type. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Vernal pools contain a large number of species that occur in no other habitat. As a consequence, they constitute one of the most sensitive vegetation communities found in the Unit. A study by Holland and Jain (1990) indicates that of approximately 100 species typically found in vernal pools, 55 species are endemic to California. The expansion of agriculture and other development has taken a heavy toll on vernal pools in the Sacramento Valley. In Sacramento County, where vernal pools once proliferated, less than 1 percent of land area remains in vernal pools (Holland and Jain 1990).

A number of conditions threaten the sustainability of vernal pools in the Unit. The single large vernal pool in the vicinity of Snowberry Way appears to receive run-off from neighboring yards during the winter, which can be a source of undesirable nutrient enrichment. Such enrichment can lead to a decline of native vernal pool plants and an expansion of ruderal and non-native weedy hydrophytic species. Additionally, the Snowberry Pool appears to have been mowed. This can be desirable for maintaining native annual pool species if conducted in the summer after flowering is completed. However, if conducted prior to the completion of flowering, mowing can lead to a decline of native annual species.

Vernal pools do not follow a classic successional trajectory from early colonizers to late successional competitive species, as seen in other community types. Instead, vernal pools display seasonal cycles associated with hydrological fluctuations. Undisturbed native vernal pools exhibit a characteristic topographic zonation of concentric rings. The pool margins often support a completely different suite of plants than are found only a few feet away in the bottom of the pool. The zonation is thought to be the result of differential germination as water levels drop and of soil chemistry gradients resulting from evaporative processes.

The effect of fire on germination and species occurrence is not well documented for vernal pools. Their location in a grassland matrix suggests that vernal pools experienced regular fire events in the past, but its effect on succession is not known.

Vernal pools are usually subject to U.S. Army Corps of Engineers jurisdiction under Section 404 of the Clean Water Act, and Regional Water Quality Control Board jurisdiction under Section 401 of the Clean Water Act. The parameters by which the limits of jurisdictional area can be determined are described above under "Freshwater Marsh."

#### Lake Shoreline Fluctuation Zone

*General Description.* Water elevations along the shoreline of Folsom Lake fluctuate annually between mean annual low and high water elevations (466 feet NGVD). This zone is subject to extreme fluctuations in moisture conditions. During high pool conditions from late winter to mid-spring, this fluctuation zone is partially to fully inundated and has water depths

ranging from <1 foot at its upper reaches to >20 feet at its lower reaches. During low pool conditions over the rest of the year, the shoreline fluctuation zone has fully desiccated soils at its upper reaches and saturated or near-saturated soil conditions at its lower reaches.

The shoreline fluctuation zone can vary in width from 30 feet to more than 1,000 feet depending upon the shoreline slope and water level drop. The fluctuation zone is particularly wide where gently sloping arms of the lake extend well inland in such places as Beek's Bight, Indian Springs and Browns Ravine (Figures PL-16a and PL-16b).

The upper elevation of the fluctuation zone is defined by the ordinary high water line (OHWL) of the reservoir, and is the upper edge of U.S. Army Corps of Engineers jurisdiction under Section 404 of the Federal Clean Water Act, except in locations where wetlands occur above the OHWL. Corps jurisdiction extends to the landward edge of such wetlands. (Figure PL-11).

The Lake Natoma shoreline is not subject to annual water level fluctuations. Rather, water levels typically fluctuate up and down by several feet each day based on water releases from Nimbus Dam for the purposes of re-regulating power releases from Folsom Dam.

*Appearance.* When exposed, much of the shoreline zone remains barren or poorly vegetated with sparse, patchy stands of ruderal species, probably due to one or more conditions that are unfavorable to vegetation colonization including steep slope, unconsolidated or poorly consolidated substrates, rapid desiccation of exposed soils and trampling from human uses (Figures PL-17 and PL-18). However, other portions of the shoreline zone are seasonally or permanently vegetated. Where the shoreline slope is not too steep, it is colonized in the spring by broad-leaved ruderal forbs and later develops stands of annual grasses.

Where intermittent drainages enter the lake, or where soil moisture conditions prevent soil desiccation (possibly due to subsurface inflows or due to perched water tables), perennial wetland graminoids and forbs may persist during and after periods of inundation, spreading by rhizomes as water levels drop. Typical examples of these perennially vegetated "wet meadows" are found in the upper shoreline fluctuation zones at Brown's Ravine and at Beeks' Bight.

Additionally, in many shoreline locations, intermittent stands of willows are found. These willow stands are able to tolerate partial or even full inundation under high water conditions. Under low water conditions they can tolerate dry soil conditions because they are able to extend long taproots that reach the water table.

*Characteristic Plant Species.* Within the mix of plants found along the lake margins, there are species adapted to wet environments and those more typical of ruderal areas. Following lake water level drops, stands of common broadleaf forbs colonize the newly-exposed soils in many locations, producing wildflower displays of such species as miniature lupine (*Lupinus bicolor*) and vetch (*Vicia sativa*). Later in the season, sparse non-native annual grasses become dominant including wild oat, ripgut brome and Italian ryegrass. The uppermost (and driest) reaches of shoreline zone often contain stands of yellow starthistle.

In more mesic shoreline locations, such as the lake arms mentioned above, stands of prickly grass (*Crypsus niliaca*), lovegrass (*Eragrostis* sp.), silversheath knotweed (*Polygonum argyrocoleon*), bermuda grass (*Cynodon dactylon*), willow herb (*Epilobium brachycarpum*)

and weedy cudweed (*Gnaphthalam* sp.) are found. Pockets of wetland vegetation occur in the shoreline zone in areas of persistent soil moisture, such as Beek's Bight and Indian Springs. Species in these locations include cocklebur (*Xanthium strumarium*), bristly oxtongue (*Picris echioides*), spikerush (*Eleocharis* spp.), sow thistle (*Sonchus asper*) and Baltic rush (*Juncus balticus*).

Along some portions of the shoreline, early springtime growth produces wildflower displays of such common ruderal and grassland species as clovers (*Trifolium* spp.), butter and eggs (*Triphysaria eriantha*), mustard (*Brassica rapa*) and pearly everlasting (*Anaphalis margaritacea*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence in the Unit.* The lake shoreline fluctuation zone occurs around the perimeter of Folsom Lake in varying widths depending on shoreline topography.

*Associated Special Status Plant Species.* No special status species are known to occur in this community. Table PL-3 provides information on special status plant species expected to occur in the Unit.

*Management Considerations.* Most of the shoreline zone plant community is arrested in an early successional stage that favors annual grass and forb species adapted to colonization. Disturbance from regular water level changes and other human activities (e.g., driving vehicles below waterline, trampling) prevents the vegetation from developing into a more mature community.

Little or no fire potential exists in the shoreline zone. Thin stands of vegetation with low cover and large patches of barren ground have reduced fuel loads. Higher soil moisture conditions also reduce the wildfire potential. However, ignition potential may be higher than more remote areas of the park simply because human use is greater. The possibility of fire spread is low within these areas, but if not suppressed, may jump to adjacent vegetation communities with higher fuel loads.

### Ruderal and Barren Areas

*General Description.* Ruderal (disturbed, weedy) and barren areas do not constitute a community type, per se, but nevertheless occur as a common cover type in the Unit. Ruderal areas have no direct analog in the Sawyer and Keeler-Wolf (1995) or Holland (1986) classification systems. Ruderal and barren areas occur throughout the Unit but are most prominent along the reservoir shoreline (see discussion above) and, along roadsides and boat-launch aprons, in camping and picnic areas, and other areas where human activity has compacted the soil or otherwise heavily impacted the vegetation.

*Characteristic Plant Species.* Ruderal areas are dominated by a mix of weedy plant species typical of much of Northern and Central California. Common species include the same species as those described above for the non-wetland shoreline, as well as invasive exotic plant species such as yellow starthistle, Italian thistle (*Carduus pycnocephalus*), and white sweet clover (*Melilotus albus*). Table PL-2 provides a list of all plant species known or expected to occur in each vegetation community type in the Unit.

*Occurrence within the Unit.* Ruderal and barren areas (including the shoreline fluctuation zone) occupy approximately 1,035 acres of the Unit, occurring along roadsides and boat-launch aprons, in camping and picnic areas, and other areas where human activity has compacted the soil or otherwise heavily impacted the vegetation (Figures PL-16a and PL-16b).

*Associated Special Status Plant Species.* No special status species are known or expected to occur in this community.

*Management Considerations.* Similar to the lake shoreline, the disturbed/ruderal community is arrested in an early successional stage that favors annual grass and forb species adapted to colonization. Disturbance from human activities (driving vehicles below waterline, camping, and trampling) prevents the vegetation from developing into a more mature community.

Disturbed areas that support vegetation have low to moderate fuel loads. Ignition potential may be higher than in more remote areas of the Unit simply because human use of disturbed and ruderal areas is proportionately greater. For example, ruderal vegetation stands along roadsides are particularly prone to wildfires due to such ignition sources as tossed cigarette butts and contact with hot catalytic converters beneath idling vehicles. The possibility of fire spread is low within the ruderal areas, but if not suppressed, may jump to adjacent vegetation communities with higher fuel loads.

## **Aquatic Vegetation**

Aquatic vegetation consists of all rooted, submerged or floating plant species found in lakes, streams or ponds but does not include emergent wetland species or other marsh plants. Rooted aquatic vegetation is rare throughout most of Folsom Lake. This lack of aquatic vegetation may be a function of turbid water conditions limiting light penetration, plus a decreasing water level as the summer progresses that exposes large areas of formerly submerged substrate.

Aquatic vegetation in Lake Natoma is restricted to intrusions of water hyacinth (*Eichhornia crassipes*) in the areas of Alder Creek and Willow Creek, duckweed (*Lemna* sp.) in Alder Creek, and several other aquatic plant species in the backwaters of the Teichert property portion of Mississippi Bar. These shallow ponds may contain *Elodea* spp., *Potamogeton* spp., and *Myriophyllum* spp., all of which are submerged species. However, at the time of observation in October 2002, these ponds were 80 percent covered with Eurasian milfoil (*Myriophyllum spicatum*) with sparse false loosestrife (*Ludwigia peploides*) along the edges. The Ludwigia and water hyacinth are both floating aquatic plants.

All of the aquatic plant species that are known to occur in the Unit are considered non-native aquatic weed species. Therefore, they are discussed in more detail in the Invasive Exotic Plants section below. The locations within which they generally occur are depicted in Figures PL-19a and PL-19b.

## **Special Status Plants**

A special-status plant species, as defined here, meets one or more of the following criteria:

- Officially listed by the California Department of Fish and Game (CDFG) as rare, threatened, or endangered and/or by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered or proposed for listing.
- A federal or State candidate species for listing as threatened or endangered or State candidate for listing as rare. Such a species may become formally listed during the course of a project.
- Listed under one of the following categories in the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik 1994) and/or the Electronic Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik 1994; update 2001):

List 1A – Plants presumed extinct in California.

List 1B – Plants rare, threatened, or endangered in California and elsewhere.

List 2 – Plants rare, threatened, or endangered in California but more common elsewhere.

List 1A, List 1B, and List 2 species may meet the definition of rare and endangered under the California Environmental Quality Act (CEQA) (Sect. 15380); a species not included on any formal list “shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria” for listing. List 3 species are plants for which necessary information is lacking to assign them to any of the other lists, and List 4 species are plants of limited distribution. Therefore, there is usually not enough information available for species on List 3 and List 4 to meet the CEQA definition of rare and endangered plants.

Based on a review of prior records, 24 special-status species (including List 3 species) were identified as occurring in the general vicinity of the Unit (Table PL-3). Occurrence records for these species were located in the *California Natural Diversity Data Base* (CNDDB 2002) and the California Native Plant Society's *Electronic Inventory* (CNPS 2001) covering the 16 U.S. Geological Survey (USGS) 7.5-minute Quadrangles that encompass the Unit and adjacent areas: Pilot, Clarks, Folsom, Rocklin, Auburn, Goldhill, Lincoln, Roseville, Citrus Heights, Folsom SE, Buffcreek, Carmike, Greenwood, Coloma, Shinglesprings and Latrobe.

As indicated in Table PL-3, there are 9 known occurrences of special status plant species within the Unit or in the vicinity of the Unit (less than 1 mile from the Unit boundary). These special status plant species are Bisbee Peak rush rose (*Helianthemum suffrutescens*), Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeae*), El Dorado bedstraw (*Galium californicum* ssp. *sierrae*), El Dorado County mule ears (*Wyethia reticulata*), Layne's ragwort (*Senecio layneae*), pincushion navarretia (*Navarretia myersii* ssp. *myersii*), red-hills soaproot (*Chlorogalum grandiflorum*), Sacramento orcutt grass (*Orcuttia viscida*), and Stebbin's morning glory (*Calystegia stebbinsii*).

Based on their habitat requirements, there is the potential for 13 other special status plant species to occur in the Unit (Table PL-3). Two special status plant species (San Joaquin

spearscale and hispid bird's-beak) are unlikely to occur in the Unit because they are found on alkali soils that are not known to occur in the vicinity.

The habitat types that have the potential to support special status species in the Unit are chaparral, woodland, vernal pool, and freshwater marsh. Several species are likely to occur in multiple habitat types. The specific habitat requirements for each special status species, as well as their Federal/State/CNPS listing status, is provided in Table PL-3. The locations of known occurrences or potential habitat for special status plants are depicted in Figures PL-20a and PL-20b.

### Chaparral and Woodland Special Status Plant Species

The following special status species have the potential to occur in both chaparral and cismontane (mid-elevational) woodland vegetation communities in the Unit:<sup>7</sup>

- Big-scale balsamroot (*Balsamorhiza macrolepis*) - 1B
- Stebbin's morning glory (*Calystegia stebbinsii*) - FE, SE, 1B
- Pine Hill ceanothus (*Ceanothus roderickii*) - FE, SR, 1B
- Red Hills soaproot (*Chlorogalum grandiflorum*) - 1B
- Brandegee's clarkia (*Clarkia biloba ssp. brandegeae*) - 1B
- Pine Hill flannelbush (*Fremontodendron decumbens*) - FE, SR, 1B
- Butte County fritillary (*Fritillaria eastwoodiae*) - 3
- El Dorado bedstraw (*Galium californicum ssp. sierrae*) - FE, SR, 1B
- Bisbee Peak rush rose (*Helianthemum suffrutescens*) - 3
- Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) - 1B
- Layne's ragwort (*Senecio layneae*) - FT, SR, 1B
- El Dorado County mule ears (*Wyethia reticulata*) - 1B

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<sup>7</sup> FE - Federally-listed as endangered.

FT - Federally-listed as threatened.

SE - State-listed as endangered.

SR - State-listed as rare.

CNPS List 1B - California Native Plant Society - plants rare, threatened or endangered in California and elsewhere.

CNPS List 2 - California Native Plant Society - plants rare, threatened, or endangered in California but more common elsewhere.

CNPS List 3 - California Native Plant Society - plants about which we need more information – a review list.

All of these species are known to occur within the four USGS quadrangles that surround the Unit, with the exception of Butte County fritillary and the Red Bluff dwarf rush (Table PL-3). El Dorado County mule ears is known to occur within the boundaries of the Unit, west of Salmon Falls, opposite Indian Springs Creek (Figure PL-20a). Brandegee's clarkia and El Dorado bedstraw are known to occur within or immediately outside the Unit boundary in the vicinity of Salmon Falls Road at Sweetwater Creek (Figure PL-20a). Pine Hill ceanothus occurs in the vicinity of Salmon Falls to the north and south of the South Fork of the American River. Layne's ragwort and Stebbin's morning-glory are found just outside the boundaries of the Unit in the vicinity of the Salmon Falls Road Bridge, south of the South Fork of the American River (Figure PL-20a).

The Pine Hill Ecological Reserve, located approximately 4 miles southeast of the South Fork, also contains Stebbin's morning glory, Pine Hill flannelbush, Layne's ragwort, Pine Hill ceanothus, El Dorado mule ears, and El Dorado bedstraw. Table PL-3 provides information on the distance from the Unit to the nearest known populations of each special status plant species.

Soil characteristics determine the location and the composition of the vegetation community in which these species occur. The soils are dry and rocky and often have serpentine or gabbroic characteristics. When these species occur in chaparral communities, they are typically found in mixed chaparral and not chamise chaparral (the type that occurs at the Unit). On this basis, the likelihood of occurrence for these species decreases. However, pockets of mixed chaparral that simply were not detected during ground-truthing surveys may occur within larger stands of chamise chaparral.

The chaparral and woodland communities in which these species occur are most threatened by residential development and alteration of fire regimes. Acquisition of adjacent parcels and the development of a fire management plan (particularly for chaparral) would be the best way to ensure the integrity of these vegetation communities and thus, protect potential populations of these special status species.

Special status species surveys should focus on areas within the Unit where soils are serpentine or gabbroic in origin. Generally, these soils occur along the South Fork of the American River. The El Dorado County Soils map identifies small pockets of serpentine and gabbroic soils and should be the primary source for soil information. The survey team should visit the Pine Hill Ecological Reserve to become familiar with the species and the vegetation community in which they occur.

### **Woodland Special Status Plant Species**

The following species have the potential to occur in woodlands but are not found in chaparral communities:

- Tuolumne button-celery (*Eryngium pinnatisectum*) - 1B
- Dubious pea (*Lathyrus sulphureus* var. *argillaceus*) - 3

Table PL-3 provides information on the distance from the Unit to the nearest known populations of each special status plant species.

The closest known occurrence of Tuolumne button-celery to the Unit is in the Folsom SE USGS quadrangle, Sacramento County. The dubious pea has been located in the Auburn quadrangle, Placer County. Both species have been found in cismontane woodlands. Occurrences of button celery within woodlands are most likely located along a riparian creek, or wetland, as button celery require moist soil conditions. Little additional information exists regarding favorable microclimate or soil characteristics that might foster these species.

Given the limited information regarding habitat requirements, it is possible that these species could occur in either interior live oak or blue oak woodland communities at the Unit. It appears more likely that they would occur in the interior live oak community because it is a more mesic environment. Within a woodland community, the button celery is most likely to occur in association with a wetland or moist drainage.

The button-celery is thought to have been heavily impacted by agricultural activities that have disrupted its habitat. The dubious pea is likely to have been affected by habitat loss due to woodland thinning and clearing.

Before special status species surveys are implemented, it would be instructive for the biologist to visit a herbarium with specimens of these two species. Field surveys would also be more effective if additional information could be found regarding detailed site characteristics where these species have been found in the past. Specific vegetation communities, soil types, or slope/aspect features would be particularly helpful for the dubious pea. Such information may exist in unpublished form through the California Native Plant Society.

### **Vernal Pools and Other Seasonal Wetland Special Status Plant Species**

The following special status species have the potential to occur in vernal pools in the Unit and may also possibly occur in other seasonal wetlands:

- Dwarf downingia (*Downingia pusilla*) - 2
- Tuolumne button-celery (*Eryngium pinnatisectum*) - 1B
- Boggs Lake hedge-hyssop (*Gratiola heterosepala*) - SE, 1B
- Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) - 1B
- Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) - 1B
- Legenere (*Legenere limosa*) - 1B
- Pincushion navarretia (*Navarretia myersii* spp. *myersii*) - 1B
- Slender Orcutt grass (*Orcuttia tenuis*) - FT, SE, 1B
- Sacramento Orcutt grass (*Orcuttia viscida*) - FT, SE, 1B

Table PL-3 provides information on the distance from the Unit to the nearest known populations of each special status plant species. Of these plants, only 4 species have been observed within the four quadrangles that surround and include the Unit: Tuolumne button-



celery, Boggs Lake hedge-hyssop, Pincushion navarretia, and Sacramento Orcutt grass. The closest known occurrence of Tuolumne button-celery to the Unit is in the Folsom SE USGS quadrangle, Sacramento County. The Boggs Lake hedge-hyssop has been found in the Rocklin quadrangle in Placer County to the west of the Unit. Pincushion navarretia and Sacramento orcutt grass are known to occur in the Phoenix Ecological Preserve, east of the Unit boundary in the vicinity of Mississippi Bar. These species are threatened by loss and/or degradation of habitat due to agricultural and residential development, heavy grazing and vehicular impacts.

These species are most likely to occur in high quality vernal pools in the Unit. Secondly, they may be found along the margins of seasonal wetlands, but not in areas with seasonal wetland vegetation. These species occur within the disturbed zone around the Folsom Lake reservoir. Special status species surveys should concentrate on known vernal pool locations.

#### Freshwater Marsh Special Status Plant Species

The following species have the potential to occur in freshwater marshes in the Unit:

- Boggs Lake hedge-hyssop (*Gratiola heterosepala*) - SE, 1B
- Sanford's arrowhead (*Sagittaria sanfordii*) - 1B

The Boggs Lake hedge-hyssop is known to occur within approximately 3.5 miles of the Unit within vernal pools in the Roseville vicinity. Sanford's arrowhead is known to occur within approximately 3.5 miles of the Unit in the Citrus Heights vicinity. Table PL-3 provides information on the distance from the Unit to the nearest known populations of each special status plant species.

The arrowhead occurs in ditches, slow-moving drainages, and around the margins of lakes and ponds. It has been observed in association with cattails, smartweed and other species of arrowheads, as well as in isolated stands on sandy soil. The hedge-hyssop observations are primarily from vernal pool habitats (see section above), but may also occur along the margin of a freshwater marsh.

Special status species surveys should concentrate on the Mormon Island freshwater marsh restoration and the marshes of Mississippi Bar. Although Avery's Pond is densely populated with non-native species, it is also a possible location to search for both species.

### **Invasive Exotic Plants**

This section briefly describes invasive exotic plant species known to occur or that could potentially occur in the Unit. Both terrestrial and aquatic species are covered. Sources of the information provided in the following section are TNC (2002); Univ. of Liverpool (2002); Univ. of Florida (2002); Washington State Department of Ecology (2002); Whitson (2001); Bossard, Randall and Hoshovsky (2000); CalEPPC (2002); Hickman (1993) and Sunset Western Garden Book (1988). Figures PL-21a and PL-21b depict known infestations of invasive exotic plants in the Unit.

**Brazilian waterweed** (*Egeria densa*, family Hydrocharitaceae) is a mat forming aquatic plant that can be found below 7,000 feet elevation in freshwater lakes, ponds and slow moving channels with turbid water. Only the male plant of this species is known to occur in California. Spread is by vegetative reproduction (i.e., root sprouting from fragmented stems). These stem fragments float on water and can be distributed to new locations by water flow, boats, animals, water fowl, and by humans dumping aquariums into freshwater systems. Brazilian waterweed was not observed in the Unit but is likely to occur in ponds and backwater areas of Mississippi Bar as well as in the perennial tributaries of Lake Natoma.

**Bull thistle** (*Cirsium vulgare*, family Asteraceae) can be found in many habitats in California below 7,000 feet elevation. Most commonly, this species is found where there is a high degree of disturbance, including but not limited to overgrazed range-land, forest clearcuts, and along road-sides in ditches and fence rows. Bull thistle's only form of reproduction is through production of abundant amounts of wind-dispersed seeds. Bull thistle is ubiquitous throughout the Unit, occurring in virtually all upland habitat types.

**Chinese tallow** (*Sapium sebiferum*) is a tree that grows and spreads rapidly, and tends to take over large areas by out-competing native plants. Although not observed in the Unit, Chinese tallow has been found growing elsewhere in native vegetation along the American River Parkway in Sacramento, California. The tree can thrive in well-drained uplands as well as in bottomlands and shores of lakes. The tree is most likely to spread to wildlands adjacent to or downstream from areas landscaped with Chinese tallow. This plant grows rapidly, begins reproduction at three years by producing abundant viable seed, and can reproduce from cuttings. Seed are spread by birds, and may also float for great distances.

**English ivy** (*Hedera helix*, family Araliaceae) has two growth forms: woody vine and evergreen shrub. English ivy is most likely to be found in riparian forests near urban areas below 3,300 feet elevation. English ivy is a popular plant to use for erosion control because of its ability to root at nodes and along the stem. The seeds are bird dispersed. Vegetative reproduction can also occur from root pieces displaced by removal efforts. English ivy was observed growing in the Unit near the Granite Bay subdivision.

**Firethorn** (*Pyracantha angustifolia*) is an evergreen shrub that can form dense stands, up to 10 feet high. It produces prolific red berries that are dispersed by birds and will readily germinate in disturbed areas and along roadsides. Firethorn was observed in the Alder Creek, Negro Bar and Mississippi Bar areas of the Unit.

**French broom** (*Genista monspessulana*, family Fabaceae) has similar habitat requirements as Scotch broom. It's commonly found in disturbed areas such as road cuts, forest clearcuts, neglected lots as well as in undisturbed natural communities in lower elevations. French broom can also thrive on low fertility/high pH alkaline soils and a wide range of moisture gradients. As is the case with Scotch broom, French broom populations can establish from only one plant due to prolific seed production and its long distance seed dispersal method. Dispersal can also be accomplished by seeds floating in rainwater and by mud lodged in crevices of boots and machinery. French broom was not observed in the Unit, however there is a strong potential for it to occur, given the presence of Scotch broom.

**Giant reed** (*Arundo donax*, family Poaceae) is a bamboo-like perennial grass that prefers to invade and colonize low-gradient riparian areas under 1,000 feet elevation. Giant reed can

grow on a broad range of soil types providing there is adequate soil moisture. Colony establishments in California are limited to vegetative reproduction either by extension of underground rhizomes or from drifting plant fragments that later produce roots. Giant reed was not observed in the Unit, however there is a strong potential for it to colonize areas in and near perennial streams and ponds, particularly in the Lake Natoma area.

**Himalayan blackberry** (*Rubis discolor*, family Rosaceae) is a woody perennial that is found throughout California at low elevation sites with adequate soil moisture. Himalayan blackberry is most common along riparian areas and can also be found growing in upland sites such as fields, pastures and roadsides. Himalayan blackberry can thrive on a variety of low fertility soils and a wide range soil pH and texture. The long-lived blackberry seeds are dispersed after passing through the digestive system of animals. Vegetative reproduction occurs when the cane tips contact the ground, root and form new clones. Clone reproduction can also occur from root pieces displaced by removal efforts. Himalayan berry is ubiquitous in the Unit, occurring in riparian zones, pond edges, moist ravines, and along the edges of Lake Natoma and Mississippi Bar. Despite its invasive nature, Himalayan berry is a food plant for small mammals and avifauna that frequent riparian areas.

**Hydrilla** (*Hydrilla verticillata*, family Hydrocharitaceae) is a perennial submersed aquatic weed that can invade any freshwater system in California. Spread is mainly from vegetative reproduction of fragmented stems, tubers, and trunions. Colonization of new areas occurs when propagules root in sediment. These propagules can be distributed to new locations by sticking to boats, fishing equipment and wildlife. Hydrilla was not observed in the Unit, but it could occur in either Lake Natoma or Folsom Lake.

**Italian thistle** (*Carduus pycnocephalus*, family Asteraceae) is common throughout much of California at low elevations and can be found in fields, disturbed areas, roadsides and pastures. Seeds of this species are spread primarily by wind, although they may also be spread by animals, seed-contaminated soils and hay. Italian thistle is ubiquitous throughout the Unit, occurring in virtually all upland habitat types.

**Klamathweed** (*Hypericum perforatum*, family Hypericaceae) is a yellow-flowered perennial forb that is widespread in northern California and the Pacific Northwest. Klamathweed reproduces both vegetatively and from seed. It grows new stems each year from a taproot and from spreading rhizomes. It is capable of producing viable seed with or without pollination and is capable of invading grasslands and wet meadows, where it replaces native plants. It occurs in the vicinity of the Snipes-Pershing preserve (Van Ess 1994).

**Medusahead** (*Taeniatherum caput-medusae*) is an annual grass characterized by multiple awned inflorescences that superficially resembles foxtail or squirreltail grasses. Medusahead originated in southern Europe and northern Africa and was introduced to California in the late 1800s. Medusahead has subsequently spread throughout the state, primarily in grassland habitats. Medusahead outcompetes native and non-native grass and forb species and forms extremely dense stands that contribute to an elevated fire danger. The mature plants contain a high silica content, making them unpalatable to livestock and native grazing animals. The grass is rapidly spread by wind, on the coats of grazing animals and on machinery and clothing. Medusahead is ubiquitous in the Lake Unit occurring commonly in grasslands throughout the Unit.

**Nuttall's waterweed** (*Elodea nuttallii*, family Hydrocharitaceae) is a submerged native to California's still or slow flowing water systems such as freshwater lakes, ponds, and ditches. This plant can continue to grow unrooted as floating fragments. Vegetative reproduction is by stem fragments floating away to root and start new plants. Nuttall's waterweed provides habitat for aquatic invertebrates and cover for young fish and amphibians as well as food for waterfowl. Also, it is of economic importance as an attractive and easy to keep aquarium plant. Nuttall's waterweed was not observed in the Unit but is likely to occur in ponds and backwater areas of Mississippi Bar as well as in the perennial tributaries of Lake Natoma.

**Oleander** (*Nerium oleander*, family Apocynaceae) is an ornamental plant that is not considered invasive in California. This highly toxic plant is able to grow in poorly drained, compacted soils, and is drought tolerant. Oleander has been reported in riparian areas in both the Central Valley and the San Bernardino Mountains and has historically been planted along state highways. Oleander is a victim of Pierce's Disease, being one of the host plants for the glassy-winged sharpshooter. Oleander grows in the Negro Bar vicinity. It has been planted by non-park personnel at Folsom Point picnic and kiosk area, and has been observed invading drainages near houses (Sally Walters, CDPR, *pers. com.*).

**Pampas grass** (*Cortaderia selloana*, family Poaceae) is an escaped ornamental grass that is commonly found in disturbed areas such as roadside ditches, conservation areas, forest clearcuts and plantations. It is an established weed along the American River near Sacramento. Both seed and root may sprout vegetative parts that enable the species to spread. Since pampas grass is dioecious, seed production depends on the presence of both male flower producing plants and female flower producing plants. However, vegetative reproduction can occur by root runners sprouting new plants up to 13 feet away from the parent plant. Root pieces displaced from the parent plant can also produce new plants if adequate moisture is available.] Pampas grass was observed growing in disturbed areas around Mississippi Bar and Negro Bar, and along the shoreline of Lake Natoma. The plant undoubtedly occurs elsewhere in the Unit.

**Parrot's feather, Eurasian milfoil** (*Myriophyllum aquaticum*, family Haloragaceae) is a dense mat forming aquatic plant that can be found in freshwater lakes, ponds and slow moving channels. This species is not known to produce viable seed in California. Spread is only known from vegetative reproduction (root sprouting from fragmented stems). These stem fragments float on water and can be distributed to new locations by water flow, boats, animals, water fowl, and by humans dumping aquariums into freshwater systems. Parrot's feather was observed in the Teichart ponds and may occur in other ponds and backwaters of Lake Natoma.

**Perennial pepperweed** (*Lepidium latifolium*, family Brassicaceae) is a perennial herb that is found from the California coast eastward to the Great Basin up to 10,000 feet elevation. Habitats are variable and include but are not limited to alkaline wetlands, marshes, roadsides, native fields and meadows. Perennial pepperweed also occurs as an agricultural weed. Perennial pepperweed is tolerant of saline and alkaline soils. Spread of this species is by either seed or fragments of the underground stem. Short-distance spread of seed is by water or wind-borne seed; long-distance spread is by contaminated rice straw, and possibly waterfowl. Perennial pepperweed was not observed in the Unit but is likely to colonize seasonal wetlands and marsh habitats.

**Periwinkle** (*Vinca major*, family Apocynaceae) is a perennial that is found throughout California at frost-free, low elevation sites with adequate soil moisture, usually wooded drainages near old home sites or wet, roadside areas where illegal dumping occurs. Vegetative root sprouting from fragmented stems is its only known form of reproduction in California. These broken stem fragments are able to float on water to begin new periwinkle colonies. Periwinkle was observed growing near homes in Granite Bay and near Negro Bar.

**Pondweed** (*Potamogeton spp.*, family Potamogetonaceae) is a common aquatic perennial that can be found in lakes, ponds, marshes, and streams. Spread of this plant, like other aquatic plants is by vegetative reproduction of fragmented stems. Pondweed also has viable seeds that float. Pondweed was not observed in the Unit but could occur in Lake Natoma, as well as associated backwaters and tributary streams.

**Privet** (*Ligustrum vulgare*, family Oleaceae) is a shrub or small tree that is common in ornamental plantings throughout California. This plant produces abundant berry like fruit that are eaten and spread by birds. The seeds remain viable and produce multitudes of seedlings. Privet was observed growing in the Granite Bay area of the Unit and in the Lake Natoma vicinity.

**Rush skeletonweed** (*Chondrilla juncea*, family Asteraceae) is a deep-rooted perennial or biennial forb that infests well-drained, light-textured soils in disturbed, usually agricultural, sites. It reproduces only by cloning, either vegetatively from roots or from seed apomixis (seeds produced without pollination). One plant can produce 15,000 to 20,000 seeds in a season (Dodd and Panetta, 1987). Once established, rush skeletonweed can dominate disturbed sites for many years. It occurs in the vicinity of the Snipes-Pershing preserve (Van Ess 1994).

**Russian thistle** (*Salsola tragus*, family Chenopodiaceae), also known as “tumbleweed,” is a bushy annual that grows to 3-1/2 feet high with slender semi-woody branches. It reproduces prolifically by seed and is noted for the tendency its mature individuals to break free from the soil and be blown about. Although it readily colonizes disturbed areas, it can also threaten native plant ecosystems, particularly grasslands and seasonal wetland. Where plants accumulate along tree rows and fence lines, it posing a serious fire hazard. It occurs in the vicinity of the Snipes-Pershing preserve (Van Ess 1994).

**Salt cedar** (*Tamarix parviflora*, family Tamaricaceae) is a shrub or small tree that is found throughout California in places where surface or subsurface water is available for most of the year. These areas can be disturbed or non-disturbed and include pond margins, ditches, springs and washes. Salt cedar prefers saline soils where other species cannot survive. It spreads by both vegetative root sprouting and by prodigious production of long-distance dispersed seeds. The seeds are dispersed by both wind and water. Salt cedar was not observed in the Unit, however it could readily colonize the edges of perennial streams and ponds, particularly in the Lake Natoma area.

**Scarlet wisteria tree** (*Sesbania punicea*, syn. *S. tripetii*, family Fabaceae) is a deciduous ornamental shrub or small tree that may be found in thickets along rivers, streams, wetlands, and marshes. The Nature Conservancy Wildland Invasive Species Team reports that scarlet wisteria tree has been found spreading into California native vegetation along the American River Parkway in Sacramento (TNC 2002). The team also lists the following undocumented reports that scarlet wisteria tree occurs in marshes around Suisun Marsh, and on the north

shore of the North Forebay of Oroville Dam. This plant has abundant production of buoyant seed pods that may be dispersed long-distance by water. It is possible that this plant can spread to wildlands adjacent to or downstream from ornamental plantings. This species as not observed in the Unit.

**Scotch Broom** (*Cytisus scoparius*, family Fabaceae) is a perennial shrub commonly found in disturbed areas such as road cuts, forest clearcuts, and neglected lots but it can also be found in undisturbed natural communities below 4,000 feet elevation. Scotch broom can thrive on low fertility soils and a wide range of moisture gradients. Large populations can result from only one plant due to prolific seed production and its long distance seed dispersal method. Scotch broom was observed at two locations in the Unit: Bender's Beach and Negro Bar.

**Spanish broom** (*Spartium junceum*, family Fabaceae) is a perennial shrub commonly found in disturbed areas such as eroding slopes, riverbanks, road cuts, as well as neglected lots and is able to colonize post-burn chaparral sites. The abundant seeds are transported via erosion, rain-wash as well as ants. Spanish broom was not observed in the Unit, but could occur in numerous disturbed locations.

**Stipa X** (*Stipa spp.*, family Poaceae). Little is known about the invasiveness of the grass species. However one large stand (1-2 acres) is known to occur in the Unit in a grassland area of the Peninsula.

**Tree of heaven** (*Ailanthus altissima*, family Simaroubaceae) is a deciduous thicket forming tree that can be found in many areas along the California coast and Sierra foothills. These areas can be disturbed or non-disturbed and include open fields, urban lots, roadsides, riparian zones. This species is tolerant of many different and extreme soil chemistries and types. Tree of heaven is a prolific root sprouter with root runners sprouting new plants up to 50 feet away from nearest shoot. Short-lived seeds are light and wind dispersed and are often spread by water, birds and on farm equipment. Tree of heaven grows in the Negro Bar area.

**Water hyacinth** (*Eichhornia crassipes*) is a native of tropical South America that has spread to more than 50 countries on five continents and has become a problem in the waterways of most of these countries. Its air-filled tissue enables it to float and spread rapidly within and between connected water bodies. The plant reproduces asexually by breaking apart into pieces, each of which develops into a separate plant. This results in a rapid increase in biomass; continuous mats of living and decaying water hyacinth up to 6.5 feet thick covering the water surface have been reported. Water hyacinth can also reproduce sexually by producing self-pollinating flowers between mid-summer and late-fall. These flowers produce seed that sink to the bottom. The released seeds can remain viable in the bottom sediments for several years, however, they require warm, shallow waters and high light intensity for germination. These conditions apparently exist in Alder Creek, where sexual propagation of water hyacinth has been observed (Sandi Richerson, BOR, *pers. com.*).

Water hyacinth was introduced to North America in 1884 via the Cotton States Exposition in New Orleans, where it was displayed in ornamental ponds and distributed as souvenirs to visitors; excess was dumped into nearby creeks and lakes. The 1884 Cotton States Exposition was probably also the initial source of the water hyacinth that was reported from the Sacramento River near Clarksburg, California in 1904. Once in California, water hyacinth spread gradually for many decades, reaching the Delta by the late 1940s or early 1950s, the federal Bureau of Reclamation tried controlling it with herbicides around 1957.

In 1982, California Senate Bill 1344 became law and directed the California Department of Boating and Waterways (CDBW) to control water hyacinth in the Delta. CDBW set up barriers to keep large masses of floating plants out of navigation channels and sprayed herbicides including Weedar (2,4-D), Diquat and Rodeo (glyphosphate). In some areas, mechanical harvesting has been used to control hyacinth, but this is more expensive than chemical spraying and disposal of the hyacinth can be a problem. Because of the cost, CDBW does not use mechanical harvesting.

In 1982 and 1983, CDBW, working with the U. S. Department of Agriculture, imported and released three insects from South America as biological controls, the moth *Sameodes albiguttalis* (which did not survive) and the weevils *Neochetina bruchi* and *N. eichhomiae*. Although the two weevils became established in the Delta, there is still a need for mechanical harvesting to control the water hyacinth.

Water hyacinth has historically occurred in Lake Natoma at three locations: the mouths of Alder Creek and Willow Creek, and in the backwaters of the Teichert property portion of Mississippi Bar. The water hyacinth in the ponds of Mississippi Bar appears to have been eradicated a number of years ago through chemical spraying by the CDBW. During the past 6 years, the BOR has funded a program with consultant, Ken Davis, to manually remove water hyacinth in Lake Natoma. The choice of manual removal over aquatic herbicide applications is due to the inability of herbicide to kill the water hyacinth seeds, which remain viable for 15 years (Sandi Richerson, BOR, *pers. com.*). Current eradication efforts at the mouths of Alder Creek and Willow Creek rely on this manual removal program. The focus of the Alder Creek effort has been the removal of water hyacinth from Alder Pond, the ponded portion of Alder Creek on the south side of Hwy 50. Water hyacinth at the confluence of Willow Creek Lake Natoma and in Willow Creek within the Unit, have also been removed manually. Additionally, both species of biocontrol weevils were released into the Willow Creek area in the summer of 2002 (Ken Davis *pers. com.*). While not yet eradicated from these sites, water hyacinth has been mostly removed and controlled (Ken Davis, *pers. com.*; Brian Deason, BOR, *pers. com.*). At present, little evidence of water hyacinth exists in the main body of Lake Natoma.

**Woolly mullein** (*Verbascum thapsus*, family Scrophulariaceae) is an erect, yellow-flowered biennial herb that infests a variety of habitats in California. It reproduces only from seed. Individual plants are capable of producing 100,000 to 240,000 seeds, which can remain viable in the soil for 35 to 100 years (Pitcairn, 2000). In montane areas of California, woolly mullein invades disturbed sites, but also is capable of invading undisturbed native meadows and moist areas within sagebrush scrub. The seeds of this plant are long-lived in the soil. It displaces native vegetation in meadow habitats and frequently becomes established following logging or fires in forested habitats (Pitcairn, 2000). It occurs in the vicinity of the Snipes-Pershing preserve (Van Ess 1994).

**Yellow starthistle** (*Centaurea solstitialis*, family Asteraceae) is a warm season annual with flowers that have long stiff spines at their base. Yellow starthistle is found in many habitats throughout northern California below 7,500 feet elevation. This species is found in disturbed and non-disturbed sites such as rangelands, grasslands, pastures, roadsides and recreational areas that have exposed areas of fertile, drier soils. Seed are the Yellow starthistle's only form of reproduction. Short-distance spread of this species is achieved by the seed head attaching itself to animal fur and/or human clothing. Seeds are also spread over long

distances from the tires of vehicles and road maintenance machinery. The seed is also spread by deposition of seed-contaminated soils and hay.

Yellow starthistle is ubiquitous throughout the Unit, occurring in virtually all upland habitats. Dense infestations occur in grasslands throughout the Unit except in the Peninsula where its presence in most grasslands is still low.

**Yellow water iris** (*Iris pseudacorus*, family Iridaceae) is a herbaceous thicket forming perennial wetland plant that can be found in or very near water. Habitat for this species include lakesides, freshwater wetlands, and salt marshes. Yellow water iris spreads by underground rhizomes and seeds. This species is an escaped ornamental that continues to be sold through garden and plant dealers and over the Internet. Within the Unit, Yellow water iris occurs in Avery's Pond as well as in Mississippi Bar ponds.

## **Recommendations**

### **Chaparral Management**

#### **Prescribed Burn Plan**

The extensive stands of chamise chaparral in the Peninsula and South Fork vicinity are dependent on a cyclic pattern of fires. The absence of such fires will lead to excessive fuel accumulation and development of a senescent or mature vegetation structure with increasingly poor habitat value for endemic flora. Conditions will gradually become more favorable for a catastrophic wildfire that would be a major concern from both public safety and biological standpoints.

CDPR is currently preparing a Unit-wide Burn Plan for the Folsom Lake State Recreation Area. The portion of the Burn Plan that deals with chaparral should seek to emulate natural fire cycles that will both reduce the fire hazard and sustain chamise chaparral stands. The plan should establish a patchwork network of burn units that will promote a mix of chaparral stand ages. The plan should also take into account the possibility that chaparral areas may contain inclusions of gabbroic and serpentine soils that support pockets of mixed chaparral and oak woodland vegetation. These pockets are potential habitat for several listed plant species (see below) that will benefit from proper fire management.

Prescribed burning plans, as well as other vegetation management efforts, shall be coordinated with the BOR. Consultation with the U.S. Fish and Wildlife Service shall be conducted as necessary, and all work shall be performed in accordance with the Operations and Maintenance Plan (O&M Plan) of the Bureau of Reclamation's Central California Area Office (Bureau of Reclamation 2000).

#### **Special Status Plant Surveys**

As shown on the vegetation maps, several locations within the Peninsula and South Fork chaparral communities may have soil conditions potentially suitable for supporting the following federally-listed endangered or threatened plant species: Eldorado bedstraw, Layne's ragwort, Pine Hill ceanothus, Pine Hill flannelbush and Stebbin's morning glory. Focused special status plant surveys should be conducted in these areas in the spring and summer in accordance with California Native Plant Society guidelines. If one or more of



these species are determined to be present, the burn plan should include provisions for ensuring that burns are conducted in a manner that maintains and promotes habitat for these species.

### Public Access

Chaparral areas present a significant risk for public access due to high fire hazard and the need for long-term fuel management. Public access is also a concern with respect to the potential presence of federally-listed plants species. Therefore, new public trail access or roads should be discouraged within or along the edges of the chaparral areas. Until a fuels management plan is designed and implemented, the CDPR should consider restricting public access during periods of high fire danger (*i.e.* “Red Flag” Days).

### **Oak Woodlands, Savannas and Grasslands Management**

In most regions of the Unit, these three vegetation communities form an interrelated complex that is well suited to integrated management approaches. This structurally and compositionally diverse mix of vegetation communities offer a wide range of habitat opportunities for many wildlife species. As described below, the most suitable management approach for this mix of communities will vary depending on location within the Unit.

### Prescribed Burn Plan

Where deemed practical and safe under the Unit Burn Plan, the preferred management approach should be prescribed burning that will maintain both safe fuel levels and the existing mix of vegetation communities. Properly timed light burns should help maintain grasslands and oak savannas by preventing young oaks from getting their start. In other locations, such burns may promote the growth of oak savanna and woodland by encouraging rapid crown sprouting from seedlings and saplings, by releasing nutrients to the soil and by reducing competition from other species. To maximize habitat diversity, the burn plan should seek to establish a mosaic of stand types of varying post-burn successional stages.

### Prescribed Burning of Dense Starthistle Grasslands

Where grasslands have become heavily invaded by yellow starthistle, the burn plan should aim to control starthistle in order to reduce fuels and enhance habitat. Grassland areas of the Unit where yellow starthistle is dense are depicted on the vegetation maps. Under this approach, repeated burns would be used to gradually reduce the starthistle seedbank (DiTomaso *et al.* 1999). Timing is critical for such burns to be effective. Typical burns must be conducted during the early summer (June-July) after native species have dispersed their seeds, but prior to maturation of starthistle seedheads. However, given the dearth of native species in many of the Unit’s grasslands, the primary determining factor as to when burns should be conducted will be the status of starthistle seedhead maturation.

### Limited Grazing

Where the Unit Burn Plan determines that existing constraints (*e.g.*, the proximity of development and infrastructure, level of fuels, size of areas) would make prescribed burning infeasible or risky, CDPR should consider the limited use of grazing animals to accomplish the same goals as prescribed fires. Under this approach, livestock, such as cows, goats or

sheep, would be allowed to intensively graze fenced pastures for brief periods. Cows and/or sheep would be more appropriate where the forage is mainly grasses and forbs while goats would be more appropriate where the forage includes more woody vegetation.

Stocking rates would need to be determined based on an analysis of the Unit forage and fuels. Grazing would be limited to the portion of the growing season when annual forage is at its maximum, thereby achieving an effective reduction in fuels. Grazing would commence at the approximate pre-flowering stage of the life cycle of non-native annual species in the grasslands. Over the long-term, this could achieve a reduction in the annuals and could promote the expansion of native perennial grasses if accompanied by a native grass re-introduction program.

Grazing should not be conducted during the dry summer and autumn and the early winter months because green herbaceous forage is not available during this period. Under these circumstances, cattle will preferentially select oak foliage and acorns as well as other woody browse, threatening reproduction and long-term persistence of oak woodlands and savannas (Barrett and Menke 1976). Cattle and sheep generally select green herbaceous forage as long as it is available, but can damage young oak trees and seedlings by browsing foliage and consuming acorns during the seasons when green herbaceous forage is not available. Livestock hoof traffic can damage oak seedlings by severing plant bases or roots.

A number of advantages and disadvantages exist for the use of livestock for vegetation management. Grazing is less risky than prescribed fires and can be very effective in both reducing fuel loads and enhancing grassland and savanna habitats if properly timed. However, grazing incurs costs to install additional fencing (either temporary in the case of sheep or permanent in the case of cattle), and may create conflicts with visitor usage of the Unit.

Proper timing of grazing would be particularly important if cattle are to be used in the vicinity of vernal pools. Cattle will readily enter vernal pools to graze on native vernal pool vegetation, whereas sheep will generally avoid water, thereby minimizing the potential for damage to pool vegetation until pool water levels have dropped. Therefore the period of time for cattle grazing around pools needs to be more restricted than for sheep.

#### Grazing to Manage Yellow Starthistle

Grasslands with starthistle may be managed using grazing. Moderate grazing with cattle, sheep or goats can gradually reduce the presence of this plant, in the same manner as prescribed burns (Thomsen *et al.* 1996). In order to be successful, the timing for grazing is important. It must be conducted in the late spring and early summer, before the starthistle seedheads have matured.

#### Management of Medusahead

In some grasslands of the Unit, medusahead is as widespread of a problem as yellow starthistle. Known infestations are depicted on the vegetation maps. Similar to starthistle, properly timed applications of grazing and/or fire can effectively reduce the presence of medusahead. Grazing or fire treatments should be conducted in the late spring or early summer after seeds have set but before they have shattered (Bossard *et. al.* 2000).

## Biological Control of Yellow Starthistle

The U.S. Department of Agriculture has approved the use of several insect species (weevils and flies) that are the natural enemies of yellow starthistle. The California Department of Food and Agriculture (CDFA) may be willing to release one or more of the insects into the Unit if it is determined (as is likely) that the population of yellow starthistle is large enough to sustain the insects at a level where they can be effective. The use of biological controls may be the most cost effective and safe means of controlling starthistle. The insects are all host specific to yellow starthistle and do not require significant investments in infrastructure or personnel. However, the insects may not be effective in significantly reducing yellow starthistle populations, except over an extended period of many years (Bossard *et. al.* 2000).

## Special Status Plant Surveys

Within some woodland areas, it is possible that one or more of the special status species described for chaparral areas (see above) could occur. These areas are shown on the vegetation maps. Focused special status plant surveys should be conducted in these areas in the spring and summer in accordance with California Native Plant Society guidelines. If one or more of these species are determined to be present, vegetation management plans should include provisions for ensuring that these species are maintained.

## **Riparian Management**

### Management of Invasive Exotic Weed Infestations.

Several mapped infestations of tree-of heaven, broom and privet within and adjacent to riparian areas are shown on the vegetation maps. Failure to manage these weed species will cause a further decline in the biological value of the Unit's riparian habitats. Recommended control approaches for each of these species are briefly discussed below.

The most appropriate control method for tree-of-heaven will depend on the size of individual trees. In the case of seedlings, hand pulling is effective if conducted after a rain when the entire seedling and root system can be pulled (Bossard *et. al.* 2000). For larger seedlings and small saplings, pulling the trees with "weed wrenches" may be effective, provided that the work is conducted under very wet soil conditions. Hand removal is ideal work for volunteer groups, particularly given the accessibility of tree-of-heaven infestations along Lake Natoma. For larger saplings and mature trees, cutting or girdling, immediately followed by applications of systemic herbicides, is recommended (Bossard *et. al.* 2000). Following all treatment approaches, it is essential that there be follow-up monitoring for one or more growing seasons, because tree-of-heaven is prone to root re-sprouting. All root sprouts should be removed until they no longer appear. Similarly, broom infestations and privet saplings can be effectively managed by pulling with weed wrenches and follow-up monitoring and removal of seedlings. Mature privets should be treated in the same manner as mature tree-of heaven.

All weed management activities in the Unit should be performed in accordance with the Bureau of Reclamation's CCAO Operations and Maintenance Plan (BOR 2002).

## Himalayan Blackberry Management

This weed is ubiquitous along riparian areas and is very difficult to control. A realistic and cost-effective management program for the Unit should entail the identification of key locations along riparian corridors (e.g., outlier populations, places where human or large wildlife access should be facilitated). In these locations, Himalayan berry should be physically removed by cutting the branches as far back as possible or by pulling with weed wrenches, if practical. This should be followed by herbicide applications and replanting of the infested areas with rapidly growing native riparian shrub species.

The yellow-breasted chat, a California Species of Special Concern (see Natural Resources – Animal Life – page AL-39), is known to frequent riparian areas with dense stands of Himalayan blackberry. Therefore, surveys for this species during the nesting season (early May- mid-July) would need to be conducted within any area proposed for Himalayan blackberry management. No management work should be conducted until the nesting season is completed, all young have fledged and the nests abandoned.

#### Monitoring for Invasive Exotic Weeds

Although not yet observed in the Unit, there is a strong potential for riparian areas to become infested with giant reed (*Arundo donax*) and salt cedar (*Tamarix ramosissima*). A proactive approach is recommended for preventing such infestations. Volunteer teams should be organized to conduct annual monitoring of perennial riparian corridors, which are the most likely locations for initial colonization by these species. If any individuals are observed, they should be immediately treated and their exact locations recorded using GPS technology so that follow up visits can be conducted.

#### Mississippi Bar Enhancement

Mississippi Bar has tremendous potential for ecological enhancement through removal of dredger mine tailing piles and restoration of a system of riparian wetlands that emulates historical riverine floodplain systems. A particularly viable opportunity to do this will occur in the next few years due to the proposed Corps of Engineers/SAFCA Folsom Dam raising project to improve flood storage potential (ACOE 2001). The project will require a huge amount of fill material for levee construction and the Mississippi Bar tailings have been identified as suitable for this purpose (Tom Washburn, SAFCA, public statement). Material can be removed and wetland/riparian systems restored at no cost to the State of California.

Dredge mine tailings at Mississippi Bar were deposited in an undulating and unnatural pattern of rock piles interspersed with slicken deposits.<sup>8</sup> Due to their lower floodplain elevations, the slickens have become well-vegetated with riparian and marsh vegetation. However the tailing rock piles are barren or are sparsely vegetated with ruderal and exotic plant species that provide little habitat value. A restoration plan could remove the tailing piles and re-establish a range of elevations, keyed to the range of water stages in Lake Natoma during normal hydrological years. Permanently and seasonally flowing backwater channels and oxbow ponds could also be excavated by connecting slicken zones or by more deeply excavating the zones from which mine tailing piles have been removed. In this way, a mosaic of riparian and wetland habitat types could be planted and allowed to develop, similar

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<sup>8</sup> “Slickens” are clay deposits left from past mining activities.

to the mosaic of habitats that naturally develop in riverine floodplain systems of bars and terraces, backwater channels and oxbows.

The value of such a restored floodplain ecosystem to local, regional and seasonally migratory fauna would be inestimable, particularly given the large size of Mississippi Bar and its proximity to the open waters of Lake Natoma. Moreover, the proximity to urbanized areas would provide a significant interpretive opportunity for the local community, demonstrating how long-term ecological damage can be restored in conjunction with a needed flood protection project.

Development of a Mississippi Bar habitat restoration plan would not only require extensive coordination with the BOR, ACOE and SAFCA but also with key regulatory agencies such as the Regional Board, CDFG, USFWA and EPA. It would require a careful analysis and predictive modeling of fluvial geomorphology and hydrology of Mississippi Bar and Lake Natoma, and should also be designed based on the structural and vegetation pattern of similar natural floodplain systems in the region.

## **Vernal Pools and Freshwater Marsh Management**

### Watershed Protection.

Maintenance of the quantity and quality of localized run-off is important for protecting vernal pool ecosystems. Placement of fill material, excavations or other surface alterations of the watershed area's vernal pools should be strictly avoided. Nutrient-laden or sediment-laden run-off of adjacent development areas should not be allowed to flow into the pool systems. Activities that would cause extensive human intrusion into pools (*e.g.*, trampling of pool sideslopes, collection of flowering annuals, litter) should also be discouraged. It is recommended that CDFG, in coordination with the BOR, establish zones of protection, marked with interpretive and cautionary signage around the Unit's vernal pool systems similar to what has already been installed at Doton's Point. The protected zones in each location should ideally encompass the entire system of vernal pools and seasonal wetlands as well as associated watershed. At a minimum, roughly two times as much watershed area should be protected as area of vernal pool and seasonal wetland (*i.e.*, if vernal pools encompass 1 acre, then at least 2 acres of watershed should be protected).

### Grazing/Mowing

Vernal pools, particularly those that are in relatively disturbed conditions such as in the vicinity of Folsom Boulevard would benefit from an annual sheep grazing or mowing regime conducted in the early-mid summer after native annuals have completed flowering and seed release. Grazing or mowing (in which the clippings are removed) prevents non-native annual grasses from forming dense thatches that inhibit the growth of native vernal pool annuals. This program could be particularly effective in promoting high quality vernal pools if coupled with a native annual plant re-introduction program.

### Special Status Plant Surveys

It would be desirable to conduct spring and early summer surveys of vernal pools for special status plants, particularly the two federally-listed species that have the potential to occur, slender Orcutt grass and Sacramento Orcutt grass.

### Aquatic Weed Management

Continued management of water hyacinth in the Lake Natoma vicinity is highly recommended, particularly at the three locations where it is known to occur: Alder Creek, Willow Creek, and the Teichert property. Management has entailed manual removal combined with introduction of a biological control agent (*Neochetina* weevil). A vigilant annual monitoring program for water hyacinth, as well as other aquatic weeds such as elodea and Eurasian milfoil is also recommended. This program could be conducted by trained volunteers.

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**Table PL-1. Summary of Terrestrial Vegetation Communities in Folsom Lake SRA**

<b>Vegetation Community</b>	<b>Classification under Sawyer and Keeler-Wolf (1995)</b>	<b>Dominant/Subdominant Species</b>	<b>Elevation Range in Folsom Lake S.R.A. (approximate)</b>	<b>Total Area in Folsom Lake S.R.A. (estimates rounded to nearest 5 acres)</b>
<b>Chamise Chaparral</b>	<b>Chamise Series;</b> Chamise/Creeping Sage Association	<b>Canopy:</b> chamise ( <i>Adenostema fasciculatum</i> ) <b>Ground Layer:</b> creeping sage ( <i>Salvia sonomensis</i> ), foxtail chess ( <i>Bromus madritensis</i> ), needlegrass ( <i>Nassella sp.</i> )	425-675 feet	450 acres
<b>Interior Live Oak Woodland</b>	<b>Interior Live Oak Series;</b> Interior Live Oak-Blue Oak-Foothill Pine Association	<b>Canopy:</b> interior live oak ( <i>Quercus wislizenii</i> ), foothill pine ( <i>Pinus sabiniana</i> ), blue oak ( <i>Quercus douglasii</i> ) <b>Understory:</b> poison oak ( <i>Toxicodendron diversilobum</i> ), California buckeye ( <i>Aesculus californica</i> ) <b>Ground Layer:</b> blue wild rye ( <i>Elymus glaucus</i> ), hedgehog dogtail grass ( <i>Cynosurus echinatus</i> ), ripgut brome ( <i>Bromus diandrus</i> )	200-775 feet	3,890 acres
<b>Blue Oak Woodland and Savanna</b>	<b>Blue Oak Series;</b> Blue Oak/Annual Grass Association	<b>Canopy:</b> blue oak <b>Ground Layer:</b> hedgehog dogtail grass, Italian thistle ( <i>Carduus pycnocephalus</i> ), wild oats ( <i>Avena fatua</i> ), ripgut brome, soft chess ( <i>Bromus hordeaceus</i> ), rose clover ( <i>Trifolium hirtum</i> ), deergrass ( <i>Muhlenbergia rigens</i> ), purple needlegrass ( <i>Nassella pulchra</i> )	400-825 feet	1,930 acres
<b>California Annual Grassland</b>	<b>California Annual Grassland Series</b>	<b>Ground Layer:</b> brachypodium ( <i>Brachypodium distachyon</i> ), ripgut brome, soft chess brome, wild oats ( <i>Avena fatua</i> ), yellow starthistle ( <i>Centaurea solstitialis</i> ), medusa head ( <i>Taeniatherum caput-medusae</i> ), mustard ( <i>Brassica nigra</i> )	100-625 feet	1,120 acres

**Table PL-1. Summary of Terrestrial Vegetation Communities in Folsom Lake SRA**

<b>Vegetation Community</b>	<b>Classification under Sawyer and Keeler-Wolf (1995)</b>	<b>Dominant/Subdominant Species</b>	<b>Elevation Range in Folsom Lake S.R.A. (approximate)</b>	<b>Total Area in Folsom Lake S.R.A. (estimates rounded to nearest 5 acres)</b>
<b>Cottonwood/Willow Riparian</b>	<b>Fremont Cottonwood Series</b> <b>Mixed Willow Series</b>	<b>Canopy:</b> Fremont cottonwood ( <i>Populus fremontii</i> ), black willow ( <i>Salix gooddingii</i> ), Northern California black walnut var. hindsii ( <i>Juglans californica</i> ), California ash ( <i>Fraxinus dipetala</i> ), narrowleaf willow ( <i>Salix exigua</i> ), arroyo willow ( <i>Salix lasiolepis</i> ) <b>Understory:</b> Buttonbush ( <i>Cephalanthus occidentalis</i> ), white alder ( <i>Alnus rhombifolia</i> ), California buckeye ( <i>Aesculus californica</i> ), arroyo willow, California grape ( <i>Vitis californica</i> )	150-550	390 acres
<b>Freshwater Marsh</b>	<b>Cattail Series;</b> Cattail-Bulrush Association	<b>Deeper water emergent vegetation:</b> cattails ( <i>Typha</i> spp.) bulrush ( <i>Scirpus californicus</i> ); <b>Shallower water emergent vegetation:</b> sedges ( <i>Carex</i> spp.), spikerush ( <i>Eleocharis macrostachya</i> ), spreading rush ( <i>Juncus patens</i> )	100-375	10 acres
<b>Seasonal Wetlands</b>	<b>Spikerush Series</b> (longer hydroperiod wetlands); (No classification for shorter hydroperiod wetlands)	<b>Longer hydroperiod wetlands:</b> sedges ( <i>Carex</i> spp. and <i>Cyperus</i> spp.), rushes ( <i>Juncus</i> spp.), spikerush <b>Shorter hydroperiod wetlands:</b> Italian ryegrass ( <i>Lolium multiflorum</i> ); rabbits-foot grass ( <i>Polypogon monspeliensis</i> )	125-500	<5 acres

Table PL-1. Summary of Terrestrial Vegetation Communities in Folsom Lake SRA

Vegetation Community	Classification under Sawyer and Keeler-Wolf (1995)	Dominant/Subdominant Species	Elevation Range in Folsom Lake S.R.A. (approximate)	Total Area in Folsom Lake S.R.A. (estimates rounded to nearest 5 acres)
Vernal Pools	Northern Claypan and Northern Hardpan Vernal Pools	<p><b>Early-mid spring:</b> Sacramento pogogyne (<i>Pogogyne ziziphoroides</i>), vernal pool buttercup (<i>Ranunculus bonariensis</i> var. <i>trisepalus</i>), threadstem navarretia (<i>Navarretia filicaulis</i>), Solano downingia (<i>Downingia ornatissima</i>), slender popcorn flower (<i>Plagiobotrys stipatus</i>).</p> <p><b>Late spring/early summer:</b> annual hairgrass (<i>Deschampsia danthonioides</i>), yellow-ray goldfields (<i>Lasthenia glaberima</i>), Fremont goldfields (<i>Lasthenia fremontii</i>), coyote thistle (<i>Eryngium castrense</i>).</p>	125-400	<5 acres
<p>Lake Shoreline Fluctuation Zone</p> <p>Ruderal and Barren Areas</p>	(none)	<p><b>Drier areas:</b> wild oat, ripgut brome, Italian ryegrass, minature lupine (<i>Lupinus bicolor</i>), vetch (<i>Vicia sativa</i>), prickly grass (<i>Crypsus niliaca</i>), lovegrass (<i>Eragrostis</i> sp.), bermuda grass (<i>Cynodon dactylon</i>), willow herb (<i>Epilobium brachycarpum</i>), clovers (<i>Trifolium</i> spp.), butter and eggs (<i>Triphysaria eriantha</i>), mustard (<i>Brassica rapa</i>), yellow starthistle, Italian thistle (<i>Carduus pycnocephalus</i>), and white sweet clover (<i>Melilotus albus</i>)</p> <p><b>Wetter areas:</b> cocklebur (<i>Xanthium strumarium</i>), bristly oxtongue (<i>Picris echioides</i>), spikerush (<i>Eleocharis</i> spp.), sow thistle (<i>Sonchus asper</i>) and Baltic rush (<i>Juncus balticus</i>)</p>	<p>400-475 feet (lake shoreline fluctuation zone)</p> <p>100-675 feet (ruderal/barren areas)</p>	1,035 acres

Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities

			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Family	Scientific Name	Common Name												
Pteridophytes (Ferns and Fern Allies)														
Blechnaceae	Woodwardia fimbriata	Giant chain fern	n				x							
Dennstaedtiaceae	Pteridium aquilinum	Bracken fern	n	x		x	x							
Dryopteridaceae	Dryopteris arguta	Wood fern	n			x								
Equisetaceae	Equisetum sp.	Horsetail rush	n					x	x					x
Isoetaceae	Isoetes sp.	Quillwort	n						x	x				
Polypodiaceae	Polypodium californicum	Licorice fern	n		x	x	x	x						
Pteridaceae	Adiantum jordanii	California maidenhair fern	n			x								
Pteridaceae	Aspidotis californica	California lace fern	n		x	x	x							
Pteridaceae	Pellaea mucronata	Bird's-oot fern	n		x	x	x							
Pteridaceae	Pellaea andromedaefolia	Coffee fern	n											
Pteridaceae	Pentagramma triangularis	Goldback fern	n											
Pteridaceae	Pentagramma triangularis	Goldback fern	n		x	x	x							
Gymnosperms (Cone-bearing Plants)														
Cupressaceae	Calocedrus decurrens	Incense cedar	n			x								
Pinaceae	Pinus ponderosa	Pacific ponderosa pine	n			x								
Pinaceae	Pinus sabiniana	Foothill pine	n		x	x	x							
Pinaceae	Pseudotsuga menziesii	Douglas fir	n			x								
Taxaceae	Taxus brevifolia	Western yew	n			x								
Taxaceae	Torreya californica	California nutmeg	n		x	x	x							
Angiosperms - Dicots (Flowering Plants)														
Aceraceae	Acer negundo var. californicum	Box elder	n			x		x						



**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced										
				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren										
Anacardiaceae	<i>Rhus trilobata</i>	Skunkbrush	n		x									
Anacardiaceae	<i>Toxicodendron diversilobum</i>	Poison oak	n		x	x	x							
Anacardiaceae	<i>Pistacia atlantica</i>	Mt. Atlas pistachio	i											x
Anacardiaceae	<i>Pistacia chinensis</i>	Chine pistachio	i											x
Apiaceae	<i>Anthriscus caucalis</i>	Bur-chervil	i			x		x						
Apiaceae	<i>Apium graveolens</i>	Celery	i					x	x					
Apiaceae	<i>Conium maculatum</i>	Poison hemlock	i					x	x	x				
Apiaceae	<i>Daucus carota</i>	Queen Anne's lace	i	x										x
Apiaceae	<i>Daucus pusillus</i>	Rattlesnake weed	n	x										
Apiaceae	<i>Eryngium castrense</i>	Coyote thistle	n							x	x			
Apiaceae	<i>Eryngium vaseyi</i>	Coyote-thistle	n							x	x			
Apiaceae	<i>Eryngium pinnatisectum</i>	Tuolumne button-celery	n			x	x							
Apiaceae	<i>Foeniculum vulgare</i>	Sweet fennel	i	x								x		x
Apiaceae	<i>Lomatium marginatum</i> var. <i>marginatum</i>	Hartweg's lomatium	n		x	x								
Apiaceae	<i>Lomatium utriculatum</i>	Common lomatium	n	x		x	x							
Apiaceae	<i>Perideridia kelloggii</i>	Kellog's yampah	n	x	x									
Apiaceae	<i>Sanicula bipinnata</i>	Poison sanicle	n	x		x								
Apiaceae	<i>Sanicula bipinnatifida</i>	Purple sanicle	n	x	x	x								
Apiaceae	<i>Sanicula crassicaulis</i>	Snakeroot	n	x		x	x							
Apiaceae	<i>Sanicula tuberosa</i>		n	x	x	x	x							
Apiaceae	<i>Scandix pecten-veneris</i>	Venus' needle	i	x										
Apiaceae	<i>Tauschia hartwegii</i>		n		x	x								
Apiaceae	<i>Torilis arvensis</i>	Hedge parsley	i		x	x								

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

			Native/Introduced											
			California Annual Grassland											
			Chamise Chaparral											
			Live Oak Woodland											
			Blue Oak Woodland & Savanna											
			Cottonwood/Willow Riparian											
			Freshwater Marsh											
			Seasonal Wetland											
			Vernal Pool											
			Lake Shoreline Fluctuation Zone											
			Aquatic/Submerged											
			Ruderal/Barren											
Family	Scientific Name	Common Name												
Apiaceae	<i>Torilis nodosa</i>	Knotted hedge parsley	i		x	x								
Apiaceae	<i>Yabea microcarpa</i>		n	x	x	x	x							
Apocynaceae	<i>Vinca major</i>	Greater periwinkle	i			x		x						
Apocynaceae	<i>Nerium oleander</i>	Oleander	i					x						x
Araliaceae	<i>Hedera helix</i>	English ivy	i			x								x
Aristolochiaceae	<i>Aristolochia californica</i>	Dutchman's pipe	n		x	x		x						
Asclepiadaceae	<i>Asclepias cordifolia</i>	Purple milkweed	n	x	x	x	x							
Asclepiadaceae	<i>Asclepias fascicularis</i>	Narrow-leaf milkweed	n	x										
Asclepiadaceae	<i>Asclepias speciosa</i>	Showy milkweed	n	x	x	x	x							
Asteraceae	<i>Achillea millefolium</i>	Yarrow	n	x	x	x	x							
Asteraceae	<i>Achyrrachaena mollis</i>	Blow-wives	n	x										
Asteraceae	<i>Agoseris grandiflora</i>	California dandelion	n	x	x	x	x							
Asteraceae	<i>Agoseris heterophylla</i>	Mountain dandelion	n	x	x	x	x							
Asteraceae	<i>Ambrosia psilostachya</i>	Ragweed	n	x								x		x
Asteraceae	<i>Anaphalis margaritacea</i>	Pearly everlasting	n	x		x	x					x		x
Asteraceae	<i>Anthemis cotula</i>	Mayweed	i	x	x	x	x					x		x
Asteraceae	<i>Artemisia douglasiana</i>	Mugwort	n	x		x	x	x		x				
Asteraceae	<i>Aster chilensis</i>	Common California aster	n	x										x
Asteraceae	<i>Baccharis pilularis</i>	Coyote brush	n	x	x	x	x							
Asteraceae	<i>Balsamorhiza deltoidea</i>	Balsam-root	n	x	x	x	x							
Asteraceae	<i>Balsamorhiza macrolepis</i>	Balsam-root	n	x	x	x	x							
Asteraceae	<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	Big-scale balsam-root	n			x	x							
Asteraceae	<i>Bidens frondosa</i>	Begger ticks	i	x										x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced										
				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren										
Asteraceae	<i>Blennosperma nanum</i> var. <i>nanum</i>	Common blennosperma	n	x	x	x	x				x	x		
Asteraceae	<i>Brickellia californica</i>	Brickellbush	n	x	x	x	x							
Asteraceae	<i>Calycadenia multiglandulosa</i>	Rosin weed	n	x	x		x							
Asteraceae	<i>Calycadenia truncata</i>	Rosin weed	n	x	x		x							
Asteraceae	<i>Carduus pycnocephalus</i>	Italian thistle	i	x			x					x		x
Asteraceae	<i>Centaurea melitensis</i>	Tocalote	i	x			x					x		x
Asteraceae	<i>Centaurea solstitialis</i>	Yellow star-thistle	i	x		x	x					x		x
Asteraceae	<i>Chaenactis glabriuscula</i>	Yellow pincushion	n	x	x		x							
Asteraceae	<i>Chamomilla suaveolens</i>	Pineapple weed	i	x				x						x
Asteraceae	<i>Chondrilla juncea</i>	Rush skeletonweed	i	x										x
Asteraceae	<i>Cichorium intybus</i>	Chicory	i	x			x					x		x
Asteraceae	<i>Cirsium occidentale</i> var. <i>californicum</i>	California thistle	n	x		x	x					x		x
Asteraceae	<i>Cirsium vulgare</i>	Bull thistle	i	x								x		x
Asteraceae	<i>Conyza bonariensis</i>	South American conyza	i									x		x
Asteraceae	<i>Conyza canadensis</i>	Horseweed	i									x		x
Asteraceae	<i>Cotula coronopifolia</i>	Brass buttons	i	x					x	x				
Asteraceae	<i>Ericameria arborescens</i>	Golden-fleece	n	x	x	x	x							
Asteraceae	<i>Erigeron foliosus</i>	Fleabane	n	x	x	x	x							
Asteraceae	<i>Eriophyllum lanatum</i>	Woolly sunflower	n	x	x	x	x							
Asteraceae	<i>Euthamia occidentalis</i>	Western goldenrod	n	x				x	x	x				
Asteraceae	<i>Filago gallica</i>	Narrow-leaved filago	i									x		x
Asteraceae	<i>Gnaphalium</i> sp.	Cudweed	n									x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced											
				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren											
Asteraceae	<i>Gnaphalium canescens</i> ssp. <i>Beneolens</i>	Fragrant everlasting	n	x	x	x	x								
Asteraceae	<i>Gnaphalium californicum</i>	California everlasting	n	x	x	x	x								
Asteraceae	<i>Gnaphalium palustre</i>	Everlasting	n	x						x	x				
Asteraceae	<i>Grindelia camporum</i>	Gumplant	n	x						x		x		x	
Asteraceae	<i>Helenium puberulum</i>	Sneezeweed	n					x	x	x					
Asteraceae	<i>Helianthella californica</i>	Diablo helianthella	n	x		x	x								
Asteraceae	<i>Helianthus annuus</i>	Common sunflower	n	x	x	x	x					x		x	
Asteraceae	<i>Helianthus californicus</i>	California sunflower	n	x			x	x		x					
Asteraceae	<i>Hemizonia fitchii</i>	Fitch's spikeweed	n	x		x	x								
Asteraceae	<i>Heterotheca grandiflora</i>	Telegraph-weed	n	x								x		x	
Asteraceae	<i>Holocarpha virgata</i>	Virgate tarweed	n	x											
Asteraceae	<i>Hypochaeris glabra</i>	Smooth cat's-ear	n	x								x		x	
Asteraceae	<i>Lactuca serriola</i>	Prickly lettuce	i	x								x		x	
Asteraceae	<i>Lasthenia chrysanthra</i>	Goldfields	n								x				
Asteraceae	<i>Lasthenia californica</i>	Goldfields	n								x				
Asteraceae	<i>Lasthenia fremontii</i>	Fremont's goldfields	n								x				
Asteraceae	<i>Lasthenia glaberrima</i>	Yellow-ray goldfields	n								x				
Asteraceae	<i>Layia fremontii</i>	Tidytops	n	x											
Asteraceae	<i>Layia pentachaeta</i>	Tidytops	n	x		x	x								
Asteraceae	<i>Leontodon taraxacoides</i>	Hairy hawkbit	i	x								x		x	
Asteraceae	<i>Lessingia leptoclada</i>		n	x			x								
Asteraceae	<i>Madia anomala</i>	Plum-seeded madia	n	x			x								

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name	Native/Introduced											
Asteraceae	<i>Madia elegans ssp. densiflora</i>	Common madia	n	x			x							
Asteraceae	<i>Madia elegans ssp. vernalis</i>	Spring madia	n	x			x							
Asteraceae	<i>Madia gracilis</i>	Slender tarweed	n	x		x	x							
Asteraceae	<i>Madia rammii</i>	Tarweed	n	x			x							
Asteraceae	<i>Madia subspicata</i>	Tarweed	n	x		x	x							
Asteraceae	<i>Micropus californicus</i>	Slender cottonweed	n	x			x			x		x		x
Asteraceae	<i>Microseris acuminata</i>	Sierra foothills microserus	n	x										
Asteraceae	<i>Microseris sylvatica</i>	Sylvan scorzonella	n	x			x							
Asteraceae	<i>Picris echioides</i>	Bristly oxtongue	i	x								x		x
Asteraceae	<i>Pseudobahia heermannii</i>		n	x	x	x	x							
Asteraceae	<i>Psilocarphus brevissimus</i>	Wooly marbles	n								x			
Asteraceae	<i>Psilocarphus tenellus</i>	Slender wooly marbles	n								x			
Asteraceae	<i>Stebbinsoseris heterocarpa</i>		n	x	x									x
Asteraceae	<i>Senecio flaccidus</i> var. <i>douglassii</i>	Groundsel	n		x									
Asteraceae	<i>Senecio vulgaris</i>	Ragwort	i									x		x
Asteraceae	<i>Senecio layneae</i>	Layne's ragwort	n		x	x	x							
Asteraceae	<i>Silybum marianum</i>	Milkthistle	i	x								x		x
Asteraceae	<i>Solidago californica</i>	California goldenrod	n	x		x	x					x		x
Asteraceae	<i>Soliva sessilis</i>	Common soliva	i									x		x
Asteraceae	<i>Sonchus asper</i>	Prickly sow-thistle	i	x				x		x		x		x
Asteraceae	<i>Sonchus oleraceus</i>	Common sow-thistle	i	x								x		x
Asteraceae	<i>Stephanomeria virgata</i>		n	x			x							
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	i	x								x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland	Cottonwood & Savanna	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Asteraceae	<i>Tragopogon porrifolius</i>	Salsify	i								x		x	
Asteraceae	<i>Tragopogon pratensis</i>	Meadow salsify	i						x		x		x	
Asteraceae	<i>Tragopogon dubius</i>	Goat's beard	i	x							x		x	
Asteraceae	<i>Wyethia augustifolia</i>	Mules ears	n	x			x							
Asteraceae	<i>Wyethia helenioides</i>	Mules ears	n	x	x									
Asteraceae	<i>Wyethia reticulata</i>	Eldorado County mules ears	n		x	x	x							
Asteraceae	<i>Xanthium spinosum</i>	Spiny cocklebur	n	x							x		x	
Asteraceae	<i>Xanthium strumarium</i>	Cocklebur	n	x				x			x		x	
Berberidaceae	<i>Berberis aquifolium</i> var. <i>dictyota</i>	Barberry	n	x	x	x	x							
Betulaceae	<i>Alnus rhombifolia</i>	White alder	n				x							
Bignoniaceae	<i>Catalpa speciosa</i>	Western catalpa	i										x	
Boraginaceae	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	Fiddleneck	n	x							x		x	
Boraginaceae	<i>Amsinckia menziesii</i> var. <i>menziesii</i>	Fiddleneck	n	x							x		x	
Boraginaceae	<i>Cryptantha flaccida</i>	Flaccid cryptantha	n	x	x		x							
Boraginaceae	<i>Cryptantha intermedia</i>	White forget-me-not	n			x	x							
Boraginaceae	<i>Cynoglossum grande</i>	Hound's tongue	n	x	x	x	x							
Boraginaceae	<i>Myosotis discolor</i>	Forget-me-not	i	x					x					
Boraginaceae	<i>Myosotis laxa</i>	Forget-me-not	n				x	x	x		x		x	
Boraginaceae	<i>Plagiobothrys greenei</i>	Greene's plagiobothrys	n	x		x	x	x	x	x				
Boraginaceae	<i>Plagiobothrys nothofulvus</i>	Popcorn-flower	n	x		x	x							
Boraginaceae	<i>Plagiobothrys stipitatus</i>	Popcorn-flower	n	x					x	x				
Brassicaceae	<i>Arabidopsis thaliana</i>	Mouse-ear cress	i	x							x		x	

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Brassicaceae	<i>Athysanus pusillus</i>		n	x	x		x							
Brassicaceae	<i>Brassica rapa</i>	Field mustard	i	x								x		x
Brassicaceae	<i>Brassica nigra</i>	Black mustard	i	x								x		x
Brassicaceae	<i>Capsella bursa-pastoris</i>	Shepard's purse	i	x								x		x
Brassicaceae	<i>Cardamine oligosperma</i>	Bitter cress	n				x		x					
Brassicaceae	<i>Draba verna</i>	Whitlow meadowgrass	i	x								x		x
Brassicaceae	<i>Erysimum capitatum</i>	Western wallflower	n	x		x	x							
Brassicaceae	<i>Hirschfeldia incana</i>	Mediterranean mustard	i				x					x		x
Brassicaceae	<i>Lepidium nitidum</i>	Peppergrass	n	x					x					
Brassicaceae	<i>Lepidium latifolium</i>	Perennial pepperweed	i				x	x	x	x	x	x		x
Brassicaceae	<i>Lepidium oblongum</i> var. <i>oblongum</i>	Peppergrass	n		x							x		x
Brassicaceae	<i>Lobularia maritima</i>	Sweet alyssum	i	x								x		x
Brassicaceae	<i>Raphanus raphanistrum</i>	Jointed charlock	i	x								x		x
Brassicaceae	<i>Raphanus sativus</i>	Radish	i	x								x		x
Brassicaceae	<i>Rorippa nasturtium-aquaticum</i>	Water cress	n				x	x						
Brassicaceae	<i>Rorippa palustris</i> var. <i>occidentalis</i>	Yellow cress	n				x		x					
Brassicaceae	<i>Sisymbrium irio</i>	London rocket	i	x								x		x
Brassicaceae	<i>Sisymbrium officinale</i>	Hedge mustard	i	x								x		x
Brassicaceae	<i>Streptanthus diversifolius</i>	Varied-leaved jewelflower	n			x	x							
Brassicaceae	<i>Streptanthus polygaloides</i>	Milkwort jewelflower	n		x	x								
Brassicaceae	<i>Thlaspi arvense</i>	Penny-cress	i	x								x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced										
				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren										
Brassicaceae	<i>Thysanocarpus curvipes</i>	Fringe-pod	n						x		x			
Brassicaceae	<i>Thysanocarpus radians</i>	Fringe-pod	n	x							x			
Brassicaceae	<i>Tropidocarpum gracile</i>		n	x										
Callitrichaceae	<i>Callitriche marginata</i>	California water starweed	n					x	x		x			
Campanulaceae	<i>Downingia ornatissima</i>	Solano downingia	n								x			
Campanulaceae	<i>Downingia pusilla</i>	Dwarf downingia	n								x			
Campanulaceae	<i>Githopsis specularioides</i>	Bluecup	n		x	x	x							
Campanulaceae	<i>Legenere limosa</i>	Legenere	n								x			
Caprifoliaceae	<i>Lonicera hispidula</i>	Honeysuckle	n			x		x						
Caprifoliaceae	<i>Lonicera interrupta</i>	Honeysuckle	n		x	x								
Caprifoliaceae	<i>Sambucus mexicana</i>	Blue elderberry	n			x	x	x						
Caprifoliaceae	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Snowberry	n			x		x						
Caryophyllaceae	<i>Cerastium glomeratum</i>	Mouse-ear chickweed	i	x	x		x					x		x
Caryophyllaceae	<i>Minuartia californica</i>	Sandwort	n		x									
Caryophyllaceae	<i>Petrorhagia prolifera</i>	Rock fissure	i									x		x
Caryophyllaceae	<i>Saponaria officinalis</i>	Bouncing bet, soapwort	i			x	x	x				x		x
Caryophyllaceae	<i>Silene californica</i>	Indian pink	n		x	x	x							
Caryophyllaceae	<i>Silene gallica</i>	Windmill pink	i	x								x		x
Caryophyllaceae	<i>Spergula arvensis</i> ssp. <i>arvensis</i>	Stickwort	i	x								x		x
Caryophyllaceae	<i>Spergularia rubra</i>	Purple sand spurrey	i	x			x		x	x		x		x
Caryophyllaceae	<i>Stellaria media</i>	Common chickweed	i	x		x	x					x		x
Caryophyllaceae	<i>Velezia rigida</i>	Velezia	i	x	x	x	x	x						
Chenopodiaceae	<i>Salsola tragus</i>	Russian thistle	i									x		x



**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name													
Cistaceae	<i>Helianthemum scoparium</i>	Peak rush-rose	n		x	x	x								
Cistaceae	<i>Helianthemum suffrutenscens</i>	Bisbee Peak rush rose	n		x										
Chenopodiaceae	<i>Chenopodium ambrosioides</i>	Mexican tea	i	x									x		x
Convolvulaceae	<i>Calystegia occidentalis</i>	Morning-glory	n	x	x	x									
Convolvulaceae	<i>Calystegia stebbinsii</i>	Stebbin's morning-glory	n		x	x	x								
Convolvulaceae	<i>Convolvulus arvensis</i>	Bindweed	i	x							x	x			x
Cornaceae	<i>Cornus glabrata</i>	Brown dogwood	n			x		x							
Crassulaceae	<i>Crassula aquatica</i>	Water Pigmy Weed	n							x	x		x		
Crassulaceae	<i>Crassula connata</i>	Pigmy weed	n	x			x					x			x
Crassulaceae	<i>Dudleya cymosa</i>	Rock lettuce	n		x	x									
Crassulaceae	<i>Parvisedum pumilum</i>		n		x	x					x				
Crassulaceae	<i>Sedum spathulifolium</i>	Stonecrop	n		x	x									
Cucurbitaceae	<i>Marah fabaceus</i>	Wild cucumber	n			x		x							
Cucurbitaceae	<i>Marah fabaceus</i> var. <i>agrestis</i>	Valley man-root	i					x							
Cucurbitaceae	<i>Marah watsonii</i>	Man root	n			x		x							
Cuscutaceae	<i>Cuscuta</i> sp.	Dodder	n		x			x		x					
Dipsacaceae	<i>Dipsacus fullonum</i>	Wild teasel	i	x						x					
Ericaceae	<i>Arbutus menziesii</i>	Madrone	n			x									
Ericaceae	<i>Arctostaphylos manzanita</i>	Parry manzanita	n		x	x									
Ericaceae	<i>Arctostaphylos viscida</i>	White leaf-manzanita	n		x	x									
Euphorbiaceae	<i>Chamaesyce maculata</i>	Spotted spurge	i	x								x			x
Euphorbiaceae	<i>Chamaesyce ocellata</i>	Valley spurge	n		x							x			x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Euphorbiaceae	<i>Eremocarpus setigerus</i>	Turkey mullein	n	x							x		x	
Euphorbiaceae	<i>Euphorbia crenulata</i>	Chinese caps	n	x	x		x							
Euphorbiaceae	<i>Euphorbia spathulata</i>	Reticulate-seeded spurge	n								x		x	
Euphorbiaceae	<i>Sapium sebiferum</i>	Chinese tallow	i				x				x		x	
Fabaceae	<i>Albizia julibrissin</i>	Silk tree	i											x
Fabaceae	<i>Amorpha californica</i>	False indigo	n		x	x	x							
Fabaceae	<i>Astragalus gambellianus</i>	Milkvetch	n	x	x									
Fabaceae	<i>Cercis occidentalis</i>	Western redbud	n	x	x	x	x	x						
Fabaceae	<i>Cytisus scoparius</i>	Scotch broom	i	x	x	x								x
Fabaceae	<i>Genista monspessulana</i>	French broom	i	x	x	x								x
Fabaceae	<i>Lathyrus latifolius</i>	Everlasting pea	i	x							x			x
Fabaceae	<i>Lathyrus nevadensis</i>	Pea	n			x								
Fabaceae	<i>Lathyrus sulphureus</i>	Pea	n			x	x							
Fabaceae	<i>Lathyrus sulphureus</i> var. <i>argillaceus</i>	Dubious pea	n			x	x							
Fabaceae	<i>Lotus grandiflorus</i>	Largeflower lotus	n	x	x	x	x	x						
Fabaceae	<i>Lotus humistratus</i>	Colchita	n	x		x	x							
Fabaceae	<i>Lotus micranthus</i>	Small-flowered lotus	n		x	x	x				x			x
Fabaceae	<i>Lotus purshianus</i>	Spanish lotus	n	x	x	x	x	x			x			x
Fabaceae	<i>Lotus scoparius</i>	California broom	n	x	x									
Fabaceae	<i>Lotus strigosus</i>	Hairy lotus	n	x	x	x	x				x			x
Fabaceae	<i>Lotus wrangelianus</i>	California lotus	n	x	x						x			x
Fabaceae	<i>Lupinus albifrons</i>	Silver lupine	n		x						x			x
Fabaceae	<i>Lupinus benthamii</i>	Spider lupine	n		x						x			x

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Family	Scientific Name	Common Name													
Fabaceae	<i>Lupinus bicolor</i>	Miniature lupine	n	x									x		x
Fabaceae	<i>Lupinus formosus</i>	Summer lupine	n	x		x									
Fabaceae	<i>Lupinus latifolius</i>	Broadleaf lupine	n	x		x	x								
Fabaceae	<i>Lupinus microcarpus</i> var. <i>densiflorus</i>	Chick lupine	n	x	x								x		x
Fabaceae	<i>Lupinus microcarpus</i> var. <i>microcarpus</i>	Whitewhorl lupine	n										x		x
Fabaceae	<i>Lupinus stiversii</i>	Harlequin lupine	n	x	x	x	x								
Fabaceae	<i>Lupinus succulentus</i>	Arroyo lupine	n	x			x						x		x
Fabaceae	<i>Medicago arabica</i>	Bur clover	n										x		x
Fabaceae	<i>Medicago polymorpha</i>	California bur clover	n	x			x						x		x
Fabaceae	<i>Medicago sativa</i>	Alfalfa	i	x			x						x		x
Fabaceae	<i>Melilotus albus</i>	White sweet clover	i	x			x						x		x
Fabaceae	<i>Melilotus indica</i>	Yellow sweet clover	i										x		x
Fabaceae	<i>Pickeringia montana</i>	Chaparral pea	n		x	x									
Fabaceae	<i>Robinia pseudoacacia</i>	Black lotus	i	x		x									x
Fabaceae	<i>Sesbania punicea</i>	Scarlet wisteria	i												x
Fabaceae	<i>Spartium junceum</i>	Spanish broom	i												x
Fabaceae	<i>Trifolium barbigerum</i>	Clover	n	x	x	x	x				x		x		x
Fabaceae	<i>Trifolium campestre</i>	Hop clover	i	x			x						x		x
Fabaceae	<i>Trifolium ciliolatum</i>	Tree clover	n	x	x	x							x		x
Fabaceae	<i>Trifolium depauperatum</i>	Clover	n	x			x						x		x
Fabaceae	<i>Trifolium dubium</i>	Shamrock clover	i	x			x						x		x
Fabaceae	<i>Trifolium glomeratum</i>	Cluster clover	i										x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Fabaceae	<i>Trifolium hirtum</i>	Rose clover	i	x							x		x	
Fabaceae	<i>Trifolium incarnatum</i>	Crimson clover	i	x		x					x		x	
Fabaceae	<i>Trifolium microcephalum</i>	Small head clover	n	x	x	x	x				x		x	
Fabaceae	<i>Trifolium obtusiflorum</i>	Creek clover	n				x	x	x					
Fabaceae	<i>Trifolium pratense</i>	Red clover	i	x		x					x		x	
Fabaceae	<i>Trifolium repens</i>	White clover	i	x		x					x		x	
Fabaceae	<i>Trifolium subterraneum</i>	Subterranean clover	i								x		x	
Fabaceae	<i>Trifolium variegatum</i>	White-tipped clover	n						x		x		x	
Fabaceae	<i>Trifolium willdenovii</i>	Tomcat clover	n	x	x				x		x		x	
Fabaceae	<i>Vicia americana</i>	American vetch	n			x	x	x			x		x	
Fabaceae	<i>Vicia sativa</i> ssp. <i>nigra</i>	Narrow-leaved vetch	i	x		x	x				x		x	
Fabaceae	<i>Vicia sativa</i> ssp. <i>sativa</i>	Spring vetch	i	x			x				x		x	
Fabaceae	<i>Vicia villosa</i>	Hairy vetch	i	x			x				x		x	
Fabaceae	<i>Vicia villosa</i> ssp. <i>varia</i>	Vetch	i								x		x	
Fabaceae	<i>Vicia villosa</i> ssp. <i>villosa</i>	Wooly vetch	i								x		x	
Fagaceae	<i>Quercus chrysolepis</i>	Maul oak, canyon live oak	n		x	x	x							
Fagaceae	<i>Quercus douglasii</i>	Blue oak	n			x	x							
Fagaceae	<i>Quercus dumosa</i>	Nuttall's scrub oak	n		x									
Fagaceae	<i>Quercus durata</i>	Leather oak	n		x									
Fagaceae	<i>Quercus kelloggii</i>	California black oak	n			x	x							
Fagaceae	<i>Quercus lobata</i>	Valley oak	n	x		x	x							
Fagaceae	<i>Quercus x morehus</i>	Oracle oak	n			x	x							
Fagaceae	<i>Quercus wislizenii</i>	Interior live oak	n		x	x	x							

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
				Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged
Garryaceae	<i>Garrya congdonii</i>	Silk tassel bush	n		x									
Garryaceae	<i>Garrya fremontii</i>	Silk tassel bush	n		x									
Gentianaceae	<i>Centaurium muehlenbergii</i>	Centaury	n	x			x							
Gentianaceae	<i>Centaurium venustum</i>	Canchalagua	n	x										
Gentianaceae	<i>Cicendia quadrangularis</i>	Microcala	n		x									x
Geraniaceae	<i>Erodium botrys</i>	Broadleaf filaree	i									x		x
Geraniaceae	<i>Erodium brachycarpum</i>	Stork's-bill	i									x		x
Geraniaceae	<i>Erodium cicutarium</i>	Red-stem filaree	i									x		x
Geraniaceae	<i>Erodium moschantum</i>	White-stem filaree	i									x		x
Geraniaceae	<i>Geranium carolinianum</i>	Carolina geranium	n	x										
Geraniaceae	<i>Geranium dissectum</i>	Cutleaf geranium	i	x								x		x
Geraniaceae	<i>Geranium molle</i>	Dove's-foot geranium	i	x	x		x					x		x
Haloragaceae	<i>Myriophyllum aquaticum</i>	Eurasian milfoil	i										x	
Hippocastanaceae	<i>Aesculus californica</i>	California buckeye	n			x		x						
Hydrocharitaceae	<i>Elodea nuttallii</i>	Nuttall's waterweed	i										x	
Hydrocharitaceae	<i>Egeria densa</i>	Brazilian waterweed	i										x	
Hydrocharitaceae	<i>Hydrilla verticillata</i>	Hydrilla	i										x	
Hydrophyllaceae	<i>Eriodictyon californicum</i>	Yerba santa	n	x	x									x
Hydrophyllaceae	<i>Nemophila heterophylla</i>	Variable-leaved nermmophila	n	x	x			x				x		x
Hydrophyllaceae	<i>Nemophila maculata</i>	Fivespot	n	x			x					x		x
Hydrophyllaceae	<i>Nemophila menziesii</i>	Baby blue-eyes	n	x			x					x		x
Hydrophyllaceae	<i>Phacelia cicutaria</i>	Fiddleneck	n	x	x		x							
Hydrophyllaceae	<i>Phacelia imbricata</i>		n	x	x	x	x					x		x

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Family	Scientific Name	Common Name												
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Hydrophyllaceae	<i>Phacelia tanacetifolia</i>		n	x							x		x	
Hypericaceae	<i>Hypericum mutilum</i>	St. John's wort	i				x							
Hypericaceae	<i>Hypericum perforatum</i>	Klamath weed	i	x							x		x	
Juglandaceae	<i>Juglans californica</i> var. <i>hindsii</i>	Black walnut	n				x							
Lamiaceae	<i>Lamium amplexicaule</i>	Dead nettle	i								x		x	
Lamiaceae	<i>Lepechinia calycina</i>	Pitcher sage	n		x		x							
Lamiaceae	<i>Lycopus americanus</i>	Water horehound	n				x		x		x		x	
Lamiaceae	<i>Marrubium vulgare</i>	Horehound	i								x		x	
Lamiaceae	<i>Mentha arvensis</i>	Mint	n				x	x						
Lamiaceae	<i>Mentha pulegium</i>	Pennyroyal	i				x	x	x	x	x			
Lamiaceae	<i>Mentha spicata</i>	Spearmint	n				x	x						
Lamiaceae	<i>Melissa officinalis</i>	Lemon balm	i	x			x		x		x		x	
Lamiaceae	<i>Monardella sheltonii</i>	Hairy monardella	n		x	x	x							
Lamiaceae	<i>Monardella villosa</i>	Coyote mint	n		x		x							
Lamiaceae	<i>Pogogyne zizyphoroides</i>	Sacramento pogogyne	n						x	x				
Lamiaceae	<i>Prunella vulgaris</i> var. <i>lanceolata</i>	Self-heal	n			x	x	x						
Lamiaceae	<i>Salvia sonomensis</i>	Sage	n		x		x							
Lamiaceae	<i>Salvia spathacea</i>	Pitcher sage	n		x	x	x							
Lamiaceae	<i>Scutellaria californica</i>	Skull cap	n	x	x		x							
Lamiaceae	<i>Scutellaria siphocampyloides</i>	Skull cap	n	x			x		x					
Lamiaceae	<i>Scutellaria tuberosa</i>	Skull cap	n		x		x							
Lamiaceae	<i>Stachys stricta</i>	Hedge nettle	n			x	x		x					

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Lamiaceae	<i>Trichostema lanceolatum</i>	Vinegar weed	n									x		x
Lauraceae	<i>Umbellularia californica</i>	California bay laurel	n		x	x								
Lemnaceae	<i>Lemna</i> sp.	Duckweed	n										x	
Limnanthaceae	<i>Limnanthus alba</i>	Meadow foam	n	x		x	x			x	x			
Limnanthaceae	<i>Limnanthus striata</i>	Meadow foam	n					x			x			
Loasaceae	<i>Mentzelia laevicaulus</i>	Blazing star	n	x			x					x		x
Lythraceae	<i>Lythrum hyssopifolium</i>	Purple loosestrife	i						x	x				
Malvaceae	<i>Malva parviflora</i>	Cheeseweed	i									x		x
Malvaceae	<i>Sidalcea calycosa</i> ssp. <i>calycosa</i>	Checker	n					x	x	x	x			
Malvaceae	<i>Sidalcea hartwegii</i>	Checkerbloom	n	x	x									
Molluginaceae	<i>Mollugo verticillata</i>	Carpet weed	i							x		x		x
Moraceae	<i>Morus</i> sp.	Mulberry	i											x
Myricaceae	<i>Myrica hartwegii</i>	Sierra sweet bay	n		x			x	x					
Oleaceae	<i>Fraxinus dipetala</i>	California ash	n			x		x						
Oleaceae	<i>Ligustrum lucidum</i>	Glossy privet	i					x						x
Oleaceae	<i>Olea europaea</i>	Olive	i											x
Onagraceae	<i>Clarkia biloba</i> ssp. <i>biloba</i>	Bilobed clarkia	n	x	x	x	x							
Onagraceae	<i>Clarkia biloba</i> ssp. <i>brandegeae</i>	Brandegee's clarkia	n		x	x	x							
Onagraceae	<i>Clarkia purpurea</i>	Purple clarkia	n	x										
Onagraceae	<i>Clarkia purpurea</i> ssp. <i>quadriveulnera</i>	Four spot purple clarkia	n	x	x									
Onagraceae	<i>Clarkia rhomboidea</i>	Tongue clarkia	n		x		x							
Onagraceae	<i>Clarkia unguiculata</i>	Elegant clarkia	n			x	x							

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Onagraceae	<i>Epilobium brachycarpum</i>	Willow-herb	n	x			x				x			
Onagraceae	<i>Epilobium canum</i>	California fuchsia, zauschneria	n		x		x							
Onagraceae	<i>Epilobium cilatum</i> ssp. <i>cilatum</i>	Northern willow-herb	n				x		x		x			
Onagraceae	<i>Epilobium cleistogamum</i>	Boisduvalia	n							x				
Onagraceae	<i>Epilobium densiflorum</i>	Denseflower willow-herb	n				x				x		x	
Onagraceae	<i>Ludwigia peploides</i>	False loosestrife, water primrose	n				x	x					x	
Onagraceae	<i>Oenothera elata</i> var. <i>hirsutissima</i>	Evening primrose	n				x	x						
Onagraceae	<i>Oenothera elata</i> ssp. <i>hookeri</i>	Evening primrose	n				x	x	x					
Orobanchaceae	<i>Orobanche uniflora</i>	Naked broom-rape	n				x	x	x					
Oxalidaceae	<i>Oxalis laxa</i>	Annual oxalis	i								x			x
Papaveraceae	<i>Dendromecon rigida</i>	Bush poppy	n		x									x
Papaveraceae	<i>Eschscholzia caespitosa</i>	Foothill poppy	n		x									
Papaveraceae	<i>Eschscholzia californica</i>	California poppy	n	x										
Papaveraceae	<i>Eschscholzia lobbi</i>	Frying pans	n	x										
Papaveraceae	<i>Meconella californica</i>	Little poppy	n	x							x			x
Papaveraceae	<i>Platystemon californicus</i>	Cream cups	n	x										
Philadelphaceae	<i>Philadelphus lewisii</i>	Wild mock orange	n			x	x	x						
Plantaginaceae	<i>Plantago coronopus</i>	Cut-leaved plantain	i	x	x						x			x
Plantaginaceae	<i>Plantago elongata</i>	Annual plantain	n							x				
Plantaginaceae	<i>Plantago erecta</i>		n	x			n							
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain	i								x			x



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Family	Scientific Name	Common Name												
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Plantaginaceae	<i>Plantago major</i>	Common plantain	i									x		x
Platanaceae	<i>Platanus racemosa</i>	Western sycamore	n					x						
Polemoniaceae	<i>Allophyllum divaricatum</i>		n		x	x								
Polemoniaceae	<i>Gilia capitata</i>	Gilia	n	x										
Polemoniaceae	<i>Gilia tricolor</i>	Bird's eyes	n	x										
Polemoniaceae	<i>Gilia tricolor</i> ssp. <i>diffusa</i>	Bird's eyes gilia	n	x			x							
Polemoniaceae	<i>Linanthus androsaceus</i>		n		x	x	x							
Polemoniaceae	<i>Linanthus bicolor</i>		n	x	x	x	x							
Polemoniaceae	<i>Linanthus dichotomus</i>	Evening snow	n		x					x				
Polemoniaceae	<i>Linanthus montanus</i>	Mustang clover	n			x	x							
Polemoniaceae	<i>Navarretia filicaulis</i>	Threadstem navarretia	n								x			
Polemoniaceae	<i>Navarretia intertexta</i>		n	x						x	x			
Polemoniaceae	<i>Navarretia leucocephala</i> ssp. <i>leucocephala</i>	White-flowered navarretia	n								x			
Polemoniaceae	<i>Navarretia myersi</i> ssp. <i>myersi</i>	Pincushion navarretia	n								x			
Polemoniaceae	<i>Navarretia pubescens</i>		n		x					x				
Polemoniaceae	<i>Navarretia squarrosa</i>	Skunkweed	n		x									
Polemoniaceae	<i>Phlox gracilis</i>	Phlox	n	x						x				
Polygalaceae	<i>Polygala cornuta</i>	Milkwort	n		x		x							
Polygonaceae	<i>Chorizanthe membranaceae</i>	Pink spineflower	n	x	x	x	x							
Polygonaceae	<i>Eriogonum latifolium</i>	Coast buckwheat	n											
Polygonaceae	<i>Eriogonum umbellatum</i>	Sulfur buckwheat	n	x										
Polygonaceae	<i>Polygonum arenastrum</i>	Common knotweed	i							x		x		x

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Family	Scientific Name	Common Name													
Polygonaceae	<i>Polygonum argyrocoleon</i>	Silversheath knotweed	i										x		x
Polygonaceae	<i>Polygonum convolvulus</i>	Black bindweed	i												x
Polygonaceae	<i>Polygonum hydropiper</i>	Water pepper	i								x		x		
Polygonaceae	<i>Polygonum punctatum</i>	Water smartweed, knotweed	n					x	x						
Polygonaceae	<i>Rumex acetosella</i>	Sheep sorrel	i						x				x		x
Polygonaceae	<i>Rumex conglomeratus</i>	Clustered dock	i					x	x						
Polygonaceae	<i>Rumex crispus</i>	Curly dock	i					x		x			x		x
Polygonaceae	<i>Rumex pulcher</i>	Fiddle dock	i												x
Portulacaceae	<i>Calandrinia ciliata</i>	Red-maids	n	x									x		x
Portulacaceae	<i>Claytonia perfoliata</i>	Miner's lettuce	n			x				x			x		x
Portulacaceae	<i>Montia fontana</i>	Water chickweed	n					x	x		x			x	
Portulacaceae	<i>Portulaca oleracea</i>	Common purslane	i										x		x
Primulaceae	<i>Anagallis arvensis</i>	Scarlet pimpernel	i										x		x
Primulaceae	<i>Centunculus minimus</i>	Chaaffweed	n							x	x				
Primulaceae	<i>Dodecatheon clevelandii</i>	White shooting-star	n	x											
Primulaceae	<i>Dodecatheon hendersonii</i>	Mosquito bills	n			x	x	x							
Ranunculaceae	<i>Aquilegia formosa</i>	Columbine	n		x	x	x	x							
Ranunculaceae	<i>Clematis lasiantha</i>	Pipestems	n	x	x	x	x								
Ranunculaceae	<i>Clematis ligusticifolia</i>	Virgins bower, Yerba de chiva	n					x	x						
Ranunculaceae	<i>Delphinium hansenii</i>	Hansen's larkspur	n		x		x								
Ranunculaceae	<i>Delphinium hesperium</i>	Western larkspur	n	x		x	x								
Ranunculaceae	<i>Delphinium patens</i>	Spreading larkspur	n	x		x	x								

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				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren										
Ranunculaceae	<i>Delphinium variegatum</i>	Royal larkspur	n	x		x	x							
Ranunculaceae	<i>Kumlienella hystrix</i>	Kumlienella	n					x						
Ranunculaceae	<i>Ranunculus aquatilis</i>		n					x	x					
Ranunculaceae	<i>Ranunculus bonariensis</i> var. <i>triseptus</i>	Vernal pool buttercup	n								x			
Ranunculaceae	<i>Ranunculus californicus</i>	California buttercup	n	x		x	x							
Ranunculaceae	<i>Ranunculus hebecarpus</i>		n		x	x	x							
Ranunculaceae	<i>Ranunculus muricatus</i>	Spiny-fruit buttercup	i							x	x	x		x
Ranunculaceae	<i>Ranunculus occidentalis</i>	Western buttercup	n	x		x	x							
Ranunculaceae	<i>Thalictrum fendleri</i> var. <i>polycarpum</i>	Meadow rue	n			x	x	x						
Rhamnaceae	<i>Ceanothus cuneatus</i>	Buck brush	n	x	x									
Rhamnaceae	<i>Ceanothus integerrimus</i>	Deer brush	n		x									
Rhamnaceae	<i>Ceanothus lemmingii</i>		n		x	x	x							
Rhamnaceae	<i>Ceanothus leucodermis</i>	Chaparral whitethorn	n		x									
Rhamnaceae	<i>Ceanothus roderickii</i>	Pine Hill ceanothus	n		x	x	x							
Rhamnaceae	<i>Rhamnus californica</i>	California coffeeberry	n		x	x	x							
Rhamnaceae	<i>Rhamnus crocea</i>	Spiny red berry	n		x									
Rhamnaceae	<i>Rhamnus ilicifolia</i>	Holly-leaved redberry	n		x									
Rhamnaceae	<i>Rhamnus tomentella</i>	Coffeeberry	n		x	x								
Rosaceae	<i>Adenostoma fasciculatum</i>	Chamise	n		x									
Rosaceae	<i>Amelanchier utahensis</i>	Utah service berry	n		x									
Rosaceae	<i>Cercocarpus betuloides</i>	Mountain mahogany	n		x	x	x							
Rosaceae	<i>Chamaebatia foliolosa</i>	Mountain misery	n			x								

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Family	Scientific Name	Common Name													
Rosaceae	<i>Fragaria vesca</i>	Wood strawberry	n			x									
Rosaceae	<i>Heteromeles arbutifolia</i>	Toyon, Christmas berry	n		x	x									
Rosaceae	<i>Malus sylvestris</i>	Apple	i												x
Rosaceae	<i>Oemleria cerasiformis</i>	Oso berry	n		x	x	x								
Rosaceae	<i>Potentilla glandulosa</i>		n	x		x	x	x							
Rosaceae	<i>Prunus ilicifolia</i>	Islay, holly-leaved cherry	n		x	x	x								
Rosaceae	<i>Prunus virginiana</i> var. <i>demissa</i>	Western chokecherry	n		x	x	x								
Rosaceae	<i>Pyracantha angustifolia</i>	Firethorn	i	x				x							x
Rosaceae	<i>Pyracantha crenatoserrata</i>	Pyracantha, firethorn	n					x							x
Rosaceae	<i>Rosa californica</i>	California rose	n					x							
Rosaceae	<i>Rubus discolor</i>	Himalayan blackberry	i					x							
Rosaceae	<i>Rubus leucodermis</i>	Blackcap raspberry	n		x			x							
Rosaceae	<i>Rubus ursinus</i>	California blackberry	n					x							
Rosaceae	<i>Sanguisorba minor</i>	Garden burnet	i												x
Rubiaceae	<i>Cephalanthus occidentalis</i> var. <i>californicus</i>	California button willow	n					x	x						
Rubiaceae	<i>Galium aparine</i>	Goose grass	n	x											
Rubiaceae	<i>Galium californicum</i> ssp. <i>sierrae</i>	Eldorado bedstraw	n		x	x	x								
Rubiaceae	<i>Galium murale</i>	Tiny bedstraw	i	x				x		x					
Rubiaceae	<i>Galium nuttallii</i>	San Diego bedstraw	n		x	x									
Rubiaceae	<i>Galium parisiense</i>	Wall bedstraw	i	x	x										
Rubiaceae	<i>Galium porrigens</i> var. <i>tenue</i>	Climbing bedstraw	n		x	x	x								

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Salicaceae	<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont's cottonwood	n				x							
Salicaceae	<i>Salix exigua</i>	Narrow-leaved willow	n				x	x						
Salicaceae	<i>Salix gooddingii</i>	Goodding's black willow	n				x		x		x			
Salicaceae	<i>Salix laevigata</i>	Red willow	n				x	x			x			
Salicaceae	<i>Salix lasiolepis</i>	Arroyo willow	n				x	x	x		x			
Salicaceae	<i>Salix lucida</i> ssp. <i>lasiandra</i>	Yellow willow	n											
Salicaceae	<i>Salix melanopsis</i>	Dusky willow	n				x							
Saxifragaceae	<i>Boykinia occidentalis</i>		n				x							
Saxifragaceae	<i>Lithophragma affine</i>	Woodland star	n	x										
Saxifragaceae	<i>Lithophragma heterophyllum</i>		n			x	x							
Saxifragaceae	<i>Saxifraga californica</i>	Saxifrage	n			x	x	x						
Scrophulariaceae	<i>Antirrhinum vexillo-calyculatum</i>	Wiry snapdragon	n		x						x		x	
Scrophulariaceae	<i>Castilleja attenuata</i>	Valley tassels	n	x			x							
Scrophulariaceae	<i>Castilleja foliolosa</i>	Woolly Indian paintbrush	n		x									
Scrophulariaceae	<i>Castilleja subinclusa</i>		n		x									
Scrophulariaceae	<i>Collinsia heterophylla</i>	Chinese houses	n		x	x	x							
Scrophulariaceae	<i>Collinsia sparsiflora</i>		n	x	x									
Scrophulariaceae	<i>Collinsia sparsiflora</i> ssp. <i>collina</i>	Blue-eyed mary	n	x	x		x				x		x	
Scrophulariaceae	<i>Collinsia tinctoria</i>		n		x	x								
Scrophulariaceae	<i>Cordylanthus pilosus</i> ssp. <i>hanseni</i>	Bird's-beak	n		x	x								
Scrophulariaceae	<i>Gratiola ebracteata</i>	Bractless hedge-hyssop	n				x	x	x	x				

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced										
				California Annual Grassland Chamise Chaparral Live Oak Woodland Blue Oak Woodland & Savanna Cottonwood/Willow Riparian Freshwater Marsh Seasonal Wetland Vernal Pool Lake Shoreline Fluctuation Zone Aquatic/Submerged Ruderal/Barren										
Scrophulariaceae	<i>Gratiola heterosepala</i>	Boggs Lake hedge-hyssop	n									x		
Scrophulariaceae	<i>Linaria canadensis</i>	Blue toadflax	n		x									
Scrophulariaceae	<i>Keckiella breviflora</i>	Gaping penstemon	n		x	x	x							
Scrophulariaceae	<i>Mimulus aurantiacus</i>	Bush monkey-flower	n		x	x								
Scrophulariaceae	<i>Mimulus cardinalis</i>	Scarlet monkey-flower	n					x						
Scrophulariaceae	<i>Mimulus floribundus</i>	Monkey-flower	n					x						
Scrophulariaceae	<i>Mimulus guttatus</i>	Common monkey-flower	n					x	x					
Scrophulariaceae	<i>Mimulus kelloggii</i>		n		x							x		x
Scrophulariaceae	<i>Mimulus tricolor</i>		n								x			
Scrophulariaceae	<i>Orthocarpus sp.</i>	Owl's clover	n											
Scrophulariaceae	<i>Pedicularis densiflora</i>	Indian warrior	n		x	x								
Scrophulariaceae	<i>Penstemon heterophyllus</i>	Beardtongue	n	x	x	x								
Scrophulariaceae	<i>Scrophularia californica</i>	California figwort	n		x			x				x		x
Scrophulariaceae	<i>Triphysaria eriantha</i>	Butter-and-eggs	n	x								x		
Scrophulariaceae	<i>Verbascum blattaria</i>	Moth mullein	i									x		x
Scrophulariaceae	<i>Verbascum thapsus</i>	Wolly mullein	i									x		x
Scrophulariaceae	<i>Veronica persica</i>	Persian speedwell	i									x		x
Simaroubaceae	<i>Ailanthus altissima</i>	Tree of heaven	i											x
Solanaceae	<i>Datura stramonium</i>	Jimson weed	i											x
Solanaceae	<i>Datura wrightii</i>	Thorn-apple	n					x		x				
Solanaceae	<i>Nicotiana acuminata</i>	Tobacco	i	x										
Solanaceae	<i>Nicotiana attenuata</i>	Coyote tobacco	n	x	x									
Solanaceae	<i>Nicotiana glauca</i>	Tree tobacco	i											x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name		Native/Introduced										
				California Annual Grassland										
				Chamise Chaparral										
				Live Oak Woodland										
				Blue Oak Woodland & Savanna										
				Cottonwood/Willow Riparian										
				Freshwater Marsh										
				Seasonal Wetland										
				Vernal Pool										
				Lake Shoreline Fluctuation Zone										
				Aquatic/Submerged										
				Ruderal/Barren										
Solanaceae	<i>Nicotiana quadrivalvis</i>	Indian tobacco	n	x					x					
Solanaceae	<i>Solanum americanum</i>	Nightshade	i											x
Solanaceae	<i>Solanum xanti</i>	Purple nightshade	n		x	x								
Sterculaceae	<i>Fremontodendron californicum</i> <i>ssp. decumbens</i>	Pine Hill flannelbush	n		x	x	x							
Styracaceae	<i>Styrax officinalis</i>	Snowdrop bush	n		x	x	x							
Urticaceae	<i>Urtica dioica</i> <i>ssp. holosericea</i>	Hoary nettle	n				x	x				x		x
Valerianaceae	<i>Plectritis ciliosa</i>		n	x		x								
Valerianaceae	<i>Plectritis ciliosa</i> <i>ssp. ciliosa</i>		n	x		x								
Valerianaceae	<i>Plectritis macrocera</i>		n	x		x								
Verbenaceae	<i>Phyla nodiflora</i>	Lippia	n					x	x	x				
Verbenaceae	<i>Verbena bonariensis</i>		i						x					x
Verbenaceae	<i>Verbena hastata</i>		n											x
Violaceae	<i>Viola douglasii</i>	Douglas violet	i	x	x									
Viscaceae	<i>Arceuthobium campylopodum</i>	Western dwarf mistletoe	n			n								
Viscaceae	<i>Phoradendron macrophyllum</i>	Mistletoe	n					x						
Viscaceae	<i>Phoradendron villosum</i>	Oak mistletoe	n			n	n							
Vitaceae	<i>Vitis californica</i>	California wild grape	n					x						
Zygophyllaceae	<i>Tribulus terrestris</i>	Puncture vine	i											x
<b>Angiosperms - Monocots (Grasses, sedges, lilies etc)</b>														
Alismataceae	<i>Damasonium californicum</i>		n					x	x		x			

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name													
Alismataceae	<i>Sagittaria latifolia</i>	Wapato, tule potato	n							x					
Cyperaceae	<i>Carex aquatilis</i>	Sedge	n					x	x	x	x	x			
Cyperaceae	<i>Carex bolanderi</i>	Wood sedge	n			x	x			x					
Cyperaceae	<i>Cyperus eragrostis</i>	Tall cyperus, Nut grass	n					x	x	x	x	x			
Cyperaceae	<i>Cyperus niger</i>	Shining cyperus	n						x	x					
Cyperaceae	<i>Eleocharis acicularis</i>	Needle spike-rush	n					x	x	x	x				
Cyperaceae	<i>Eleocharis macrostachya</i>	Spikerush	n					x	x	x		x			
Cyperaceae	<i>Eleocharis pachycarpa</i>	Spike-rush	n								x				
Cyperaceae	<i>Kyllinga brevifolia</i>	Kyllinga	i							x					x
Cyperaceae	<i>Scirpus acutus</i> var. <i>occidentalis</i>	Common tule	n					x	x						
Iridaceae	<i>Iris hartwegii</i>	Iris	n	x		x	x								
Iridaceae	<i>Iris macrosiphon</i>	Ground iris	n	x		x	x								
Iridaceae	<i>Iris pseudacorus</i>	Yellow iris	i					x	x						
Iridaceae	<i>Sisyrinchium bellum</i>	Blue-eyed grass	n	x		x	x			x					
Juncaceae	<i>Juncus articulatus</i>	Jointed rush	n							x	x	x			
Juncaceae	<i>Juncus balticus</i>	Baltic rush	n						x	x	x	x			x
Juncaceae	<i>Juncus bufonius</i>	Toad rush	n							x	x	x			
Juncaceae	<i>Juncus capitatus</i>	Capitate rush	i							x	x				
Juncaceae	<i>Juncus effusus</i> var. <i>pacificus</i>	Bog or soft rush	n					x	x	x	x	x			
Juncaceae	<i>Juncus oxymeris</i>	Pointed rush	n		x	x	x	x		x					
Juncaceae	<i>Juncus patens</i>	Spreading rush	n					x	x	x	x	x			
Juncaceae	<i>Juncus leiospermus</i> var. <i>leiospermus</i>	Red Bluff dwarf rush	n	x	x	x	x	x		x	x				



**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Juncaceae	<i>Juncus leiospermus</i> var. <i>ahartii</i>	Ahart's dwarf rush	n				x	x	x	x				
Juncaceae	<i>Juncus tenuis</i>	Slender rush	n				x	x	x	x	x			
Juncaceae	<i>Luzula comosa</i>	Bog or soft rush	n		x	x	x	x						
Lemnaceae	<i>Lemna</i> sp.	Duckweed	n			x	x							
Liliaceae	<i>Agave americana</i>	Century plant	i											x
Liliaceae	<i>Allium amplexans</i>	Narrow-leaved onion	n		x	x	x							
Liliaceae	<i>Allium hyalinum</i>	Wild onion	n	x										
Liliaceae	<i>Allium serra</i>		n	x										
Liliaceae	<i>Bloomeria crocea</i>	Common goldenstar	n	x	x	x	x							
Liliaceae	<i>Brodiaea coronaria</i>		n	x										
Liliaceae	<i>Brodiaea elegans</i>	Harvest brodiaea	n	x		x								
Liliaceae	<i>Brodiaea minor</i>	Small brodiaea	n							x				
Liliaceae	<i>Calochortus albus</i>	White globe lilly	n			x	x							
Liliaceae	<i>Calochortus argillosus</i>	Clay mariposa lily	n											
Liliaceae	<i>Calochortus luteus</i>	Yellow mariposa lily	n	x		x	x							
Liliaceae	<i>Calochortus venustus</i>	Mariposa lily	n	x	x									
Liliaceae	<i>Chlorogalum angustifolium</i>	Soap plant, amole	n	x		x								
Liliaceae	<i>Chlorogalum grandiflorum</i>	Red Hills soaproot	n		x	x	x							
Liliaceae	<i>Chlorogalum pomeridianum</i>	Soap plant, amole	n	x	x	x	x							
Liliaceae	<i>Dichelosterna capitatum</i> ssp. <i>capitatum</i>	Venal pool brodiaea	n							x				
Liliaceae	<i>Dichelostemma capitatum</i> var. <i>pauciflora</i>	Bluedicks	n	x		x								
Liliaceae	<i>Dichelostemma multiflora</i>	Wild hyacinth	n	x		x								

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
			Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Liliaceae	<i>Dichlostermma volubile</i>	Snake lily	n				x							
Liliaceae	<i>Erythronium multiscapoideum</i>	Fawn lily	n				x	x						
Liliaceae	<i>Fritillaria micrantha</i>	Brown bells	n	x										
Liliaceae	<i>Fritillaria eastwoodiae</i>	Butte County fritillary	n		x	x	x							
Liliaceae	<i>Lilium humboldtii</i>	Humboldt lily	n		x									
Liliaceae	<i>Lilium rubescens</i>	Redwood lily	n				x	x						
Liliaceae	<i>Odontostomum hartwegii</i>		n		x									
Liliaceae	<i>Triteleia hyacinthina</i>	White brodiaea	n	x					x					
Liliaceae	<i>Triteleia ixioides</i>	Golden brodiaea	n	x										
Liliaceae	<i>Triteleia laxa</i>	Ithuriel's spear	n	x			x							
Liliaceae	<i>Zigadenus venenosus</i>	Death camas	n	x					x					
Orchidaceae	<i>Piperia elegans</i>	Piperia	n	x			x							
Orchidaceae	<i>Piperia unalascensis</i>	Rein orchid	n			x	x							
Poaceae	<i>Aegilops triuncialis</i>	Barbed goatgrass	i									x		x
Poaceae	<i>Agrostis avenaceae</i>	Bent grass	i	x								x		x
Poaceae	<i>Agrostis sp.</i>	Redtop	i	x								x		x
Poaceae	<i>Aira caryophylla</i>	Silver hairgrass	i	x								x		x
Poaceae	<i>Andropogon virginicus</i>	Broomsedge	i	x					x			x		x
Poaceae	<i>Arundo donax</i>	Giant reed-grass	i					x	x			x		
Poaceae	<i>Avena barbata</i>	Slender wild oat	i	x	x	x	x					x		x
Poaceae	<i>Avena fatua</i>	Wild oats	i	x	x	x	x					x		x
Poaceae	<i>Brachypodium distachyon</i>	Brachypodium	i	x		x	x					x		x
Poaceae	<i>Briza minor</i>	Quaking grass	i	x		x	x			x		x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
				Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged
Poaceae	<i>Bromus carinatus</i>	California brome grass	n		x	x	x							
Poaceae	<i>Bromus diandrus</i>	Ripgut brome	i	x	x	x	x	x		x		x		x
Poaceae	<i>Bromus hordeaceus</i>	Soft chess	i	x	x	x	x					x		x
Poaceae	<i>Bromus laevipes</i>	Perennial brome grass	i		x	x	x							
Poaceae	<i>Bromus madritensis</i>	Foxtail chess	i		x		x							x
Poaceae	<i>Bromus madritensis</i> ssp. <i>madritensis</i>	Spanish brome grass	i		x		x					x		x
Poaceae	<i>Bromus madritensis</i> ssp. <i>rubens</i>	Red brome grass	i		x		x					x		x
Poaceae	<i>Bromus sterilis</i>	Sterile brome grass	i		x		x					x		x
Poaceae	<i>Cortaderia selloana</i>	Pampas grass	i					x	x	x		x		x
Poaceae	<i>Cynodon dactylon</i>	Bermuda grass	i							x		x		x
Poaceae	<i>Crypsis vaginiflora</i>	Prickle grass	i									x		x
Poaceae	<i>Cynosurus echinatus</i>	Hedgehog dogtail grass	n	x	x	x	x					x		x
Poaceae	<i>Deschampsia danthonioides</i>	Annual hairgrass	n							x	x			
Poaceae	<i>Echinochloa colona</i>	Jungle rice	i	x						x		x		x
Poaceae	<i>Echinochloa crus-galli</i>	Barnyard grass	i	x						x		x		x
Poaceae	<i>Elymus glaucus</i>	Blue wild rye	n			x	x	x		x		x		
Poaceae	<i>Eragrostis</i> sp.	Lovegrass	i									x		x
Poaceae	<i>Festuca subulata</i>	Bearded fescue	n			x	x	x		x				
Poaceae	<i>Gastridium ventricosum</i>	Nit grass	i	x	x							x		x
Poaceae	<i>Holcus lanatus</i>	Velvet grass	i	x								x		x
Poaceae	<i>Hordeum intercedens</i>	Little barley	n							x	x			
Poaceae	<i>Hordeum jubatum</i>	Foxtail barley	i/n	x	x	x	x	x				x		x

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name												
				Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged
Poaceae	<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley	i	x		x	x	x	x	x	x	x		x
Poaceae	<i>Hordeum marinum</i> ssp. <i>leporinum</i>	Wild barley	i	x		x	x	x	x	x	x	x		x
Poaceae	<i>Hordeum murinum</i>	Barley	i	x	x	x	x					x		x
Poaceae	<i>Leersia oryzoides</i>	Rice cutgrass	n					x	x					
Poaceae	<i>Lolium multiflorum</i>	Italian ryegrass	i	x	x	x	x	x		x	x	x		x
Poaceae	<i>Lolium perenne</i>	Perennial rye grass	i	x	x	x	x	x		x	x	x		x
Poaceae	<i>Melica californica</i>	California melic grass	n			x	x							
Poaceae	<i>Melica torreyana</i>	Torrey melic grass	n		x	x	x							
Poaceae	<i>Muhlenbergia rigens</i>	Deergrass	n			x	x	x						
Poaceae	<i>Nassella cernua</i>	Needlegrass	n		x	x	x							
Poaceae	<i>Nassella lepida</i>	Foothill needlegrass	n		x	x	x							
Poaceae	<i>Nassella pulchra</i>	Purple needlegrass	n	x	x	x	x							
Poaceae	<i>Nassella pulchra</i> x <i>N. formicarum</i>	Intergrade needlegrass	i	x										
Poaceae	<i>Orcuttia tenuis</i>	Orcutt grass	n							x	x			
Poaceae	<i>Orcuttia viscida</i>	Sacramento orcutt grass	n							x	x			
Poaceae	<i>Panicum acuminatum</i> var. <i>lindheimeri</i>	Lindheimer's panicum	n						x	x	x	x		
Poaceae	<i>Panicum capillare</i>	Old witch grass	n							x		x		x
Poaceae	<i>Paspalum dilatatum</i>	Dallis grass	i							x		x		x
Poaceae	<i>Paspalum urvillei</i>	Vasey grass	i							x		x		x
Poaceae	<i>Poa annua</i>	Annual bluegrass	i											x
Poaceae	<i>Polypogon australis</i>	Beard grass	i					x						

**Table PL-2. Plant Species Observed or Potentially Occurring in Folsom Lake SRA Vegetation Communities**

Family	Scientific Name	Common Name													
				Native/Introduced	California Annual Grassland	Chamise Chaparral	Live Oak Woodland	Blue Oak Woodland & Savanna	Cottonwood/Willow Riparian	Freshwater Marsh	Seasonal Wetland	Vernal Pool	Lake Shoreline Fluctuation Zone	Aquatic/Submerged	Ruderal/Barren
Poaceae	<i>Polypogon interruptus</i>	Interrupted beard grass	i					x							
Poaceae	<i>Polypogon maritimus</i>	Beard grass	i					x	x	x		x		x	
Poaceae	<i>Polypogon monspeliensis</i>	Rabbit's-foot grass	i						x	x	x	x		x	
Poaceae	<i>Setaria gracilis</i>	Bristlegrass	n	x	x		x								
Poaceae	<i>Sorghum halepense</i>	Johnson grass	i	x								x		x	
Poaceae	<i>Taeniatherum caput-medusae</i>	Medusahead	i	x	x	x	x					x		x	
Poaceae	<i>Vulpia myuros</i> ssp. <i>myuros</i>	Rat-tail fescue	i	x								x		x	
Pontederiaceae	<i>Eichhornia crassipes</i>	Water hyacinth	i										x		
Potamogetonaceae	<i>Potamogeton</i> spp.	Pondweed	n/i										x		
Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved cattail	n						x						
Typhaceae	<i>Typha domingensis</i>	Southern cattail	n						x						
Typhaceae	<i>Typha latifolia</i>	Broad-leaved cattail	n						x						

**Notes:**

1. Nomenclature as per Jepson (1993)
2. The following sources were used for this table:
  - Field observations by LSA botanists, July-October, 2002
  - Field observations by Folsom Lake SRA personnel, Sally Walters and Rodi Lee
  - Field observation by Sandi Richerson, Bureau of Reclamation

**Table PL-3. Special-Status Plant Species Occurring in the General Vicinity of the Folsom SRA**

<b>Species</b>	<b>Status/Federal /State/CNPS<sup>1</sup></b>	<b>Habitat Requirements<sup>2</sup></b>	<b>Blooming Period</b>	<b>Habitat on Folsom SRA</b>	<b>Nearest Known Occurrence<sup>3</sup></b>
<i>Atriplex joaquiniana</i> San Joaquin spearscale	-/-/1B	Chenopod scrub, alkali meadow, grassland; in seasonal alkali wetlands or alkali sink scrub.	Apr-Oct	Not present.	No known occurrences in the vicinity.
<i>Balsamorhiza macrolepis</i> var <i>macrolepis</i> Big-scale balsamroot	-/-/1B	Grassland, cismontane woodland; sometimes on serpentine.	Mar-Jun	Possible habitat throughout grasslands, woodlands and chaparral the SRA.	Occurs approximately 7 miles from the SRA in the vicinity of Roseville. Historic occurrence at Rattlesnake Bar – now under water.
<i>Calystegia stebbinsii</i> Stebbin's morning glory	FE/SE/1B	Chaparral, cismontane woodland; in open areas on red clay soils of the Pine Hill formation, or on gabbroic or serpentine soils. (Endemic to Pine Hill formation in El Dorado and Nevada counties.)	Apr-Jul	Suitable habitat present in chaparral and woodlands in the Peninsula area.	Just east of Salmon Falls road, approximately 1.7 miles south/southwest of the bridge over the South Fork American River.
<i>Ceanothus roderickii</i> Pine Hill ceanothus	FE/SR/1B	Cismontane woodland, chaparral; on gabbroic soils, often in “historically disturbed” areas. (Endemic to the Pine Hill Area in Eldorado County.)	May-Jun	Suitable habitat present in chaparral and woodlands in the Peninsula area.	Approximately 2.5 miles from the SRA in the vicinity of the landing strip west of Sweetwater Creek.
<i>Chlorogalum grandiflorum</i> Red Hills soaproot	-/-/1B	Cismontane woodland, chaparral, lower montane coniferous forest; on serpentine and gabbro substrates; often on “historically disturbed” sites.	May-Jun	Suitable habitat in chaparral and woodlands in the Peninsula area.	Within 1 mile of the SRA in the vicinity of Salmon Falls Road, south of the bridge crossing of the South Fork American River.
<i>Clarkia biloba</i> ssp. <i>brandegeae</i> Brandegee's clarkia	-/-/1B	Chaparral, cismontane woodland; often on roadcuts.	May-Jul	Suitable habitat in chaparral and woodlands in the Peninsula area. Possible habitat in woodlands elsewhere in the SRA.	Within or immediately outside SRA boundary in the vicinity of the Salmon Falls Road crossing of Sweetwater Creek.

**Table PL-3. Special-Status Plant Species Occurring in the General Vicinity of the Folsom SRA**

<b>Species</b>	<b>Status/Federal /State/CNPS<sup>1</sup></b>	<b>Habitat Requirements<sup>2</sup></b>	<b>Blooming Period</b>	<b>Habitat on Folsom SRA</b>	<b>Nearest Known Occurrence<sup>3</sup></b>
<i>Cordylanthus mollis</i> ssp. <i>hispidus</i> Hispid bird's-beak	-/-/1B	Meadows, playas, grassland; in damp alkaline soils, especially in alkali meadows and sinks.	Jun-Sep	Not present.	Approximately 5 miles from the SRA in the Roseville vicinity.
<i>Downingia pusilla</i> Dwarf downingia	-/-/2	Mesic grassland, vernal pools; on margins of different types of vernal pools and vernal lakes.	Mar-May	Relatively undisturbed vernal pool habitats such as those at the Nimbus Overlook Vernal Pool Preserve and the Mormon Island Preserve.	Approximately 8 miles from the SRA within several vernal pool systems in the Roseville vicinity.
<i>Eryngium pinnatisectum</i> Tuolumne button-celery	-/-/1B	Cismontane woodland, lower montane coniferous forest, vernal pools; on mesic sites.	Jun-Aug	Possible habitat in woodlands, vernal pool sites, seasonal wetlands.	More than 15 miles to the southeast of Folsom Lake SRA.
<i>Fremontodendron decumbens</i> Pine Hill flannelbush	FE/SR/1B	Chaparral, cismontane woodland; on rocky ridges, often among rocks and boulders. Endemic to gabbroic and serpentine soils. (Endemic to Eldorado and Nevada Counties.)	Apr-Jul	Suitable habitat in chaparral and woodlands in the Peninsula area. Possible habitat in woodlands elsewhere in the SRA.	Approximately 2 miles from the SRA in the vicinity of Deer Valley Road, west of Pine Hill.
<i>Fritillaria eastwoodiae</i> Butte County fritillary	-/-/3	Chaparral, cismontane woodland, lower montane coniferous forest; usually on dry slopes in serpentine, red clay, or sandy loam soils; sometimes on mesic sites.	Mar-May	Suitable habitat in chaparral and woodlands in the Peninsula area. Possible habitat in woodlands elsewhere in the SRA.	Approximately 3 miles from the SRA in the vicinity of the confluence of the Middle and North Forks of the American River.
<i>Galium californicum</i> ssp. <i>sierrae</i> El Dorado bedstraw	FE/SR/1B	Cismontane woodland, chaparral, lower montane coniferous forest; on gabbroic soils in mostly oak woodland. (Endemic to El Dorado County.)	May-Jun	Suitable habitat present in chaparral and woodlands in the Peninsula area.	Within or immediately outside SRA boundary in the vicinity of the Salmon Falls Road crossing of Sweetwater Creek.

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<b>Species</b>	<b>Status/Federal /State/CNPS<sup>1</sup></b>	<b>Habitat Requirements<sup>2</sup></b>	<b>Blooming Period</b>	<b>Habitat on Folsom SRA</b>	<b>Nearest Known Occurrence<sup>3</sup></b>
<i>Gratiola heterosepala</i> Boggs Lake hedge-hyssop	-/SE/1B	Freshwater marshes and swamps, vernal pools; in clay soils, usually in vernal pools, sometimes on lake margins.	Apr-Aug	Relatively undisturbed vernal pool habitats such as those at the Nimbus Overlook Vernal Pool Preserve and the Mormon Island Preserve. Possibly along the margins of perennial creeks such as New York Creek and Willow Creek.	Approximately 3.5 miles from the SRA in vernal pools east of Roseville.
<i>Helianthemum suffrutescens</i> Bisbee Peak rush rose	-/-/3	Chaparral; in openings, often on serpentine, gabbroic, or Ione formation soils.	Apr-Jun	Suitable habitat present in chaparral and woodlands in the Peninsula area.	Near boundary of Folsom Lake SRA – approximately 0.7 miles south of bridge over S. Fork American River.
<i>Juncus leiospermus</i> var. <i>ahartii</i> Ahart's dwarf rush	-/-/1B	Vernal pools; restricted to edges of pools.	Mar-May	Vernal pool and seasonal wetland habitats such as those at the Nimbus Overlook Vernal Pool Preserve, Mormon Island Preserve and Snowberry Vernal Pool Preserve and Snipes-Pershing Park.	Approximately 6 miles from the SRA in the vicinity of Blodgett Reservoir, southeast of Ranch Cordova.
<i>Juncus leiospermus</i> var. <i>leiospermus</i> Red Bluff dwarf rush	-/-/1B	Chaparral, grassland, cismontane woodland, vernal pools; in vernal mesic sites or at edges of vernal pools.	Mar-May	Possible habitat present along vernal pool margins and in other moist locations in natural habitats throughout the SRA.	Approximately 6 miles from the SRA along the margins of vernal pools in the Roseville vicinity.
<i>Lathyrus sulphureus</i> var. <i>argillaceus</i> Dubious pea	-/-/3	Cismontane woodland, lower and upper montane coniferous forest.	Apr	Possible habitat in woodlands.	No known occurrences in the vicinity.



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<b>Species</b>	<b>Status/Federal /State/CNPS<sup>1</sup></b>	<b>Habitat Requirements<sup>2</sup></b>	<b>Blooming Period</b>	<b>Habitat on Folsom SRA</b>	<b>Nearest Known Occurrence<sup>3</sup></b>
<i>Legenere limosa</i> Legenere	-/-/1B	Vernal pools; in beds of pools. (Many historical occurrences extirpated.)	Apr-Jun	Relatively undisturbed vernal pool habitats such as those at the Nimbus Overlook Vernal Pool Preserve and the Mormon Island Preserve.	Approximately 5 miles from the SRA in the vicinity of Mather AFB.
<i>Navarretia myersii</i> ssp. <i>myersii</i> Pincushion navarretia	-/-/1B	Vernal pools, mesic grassland; on clay soils within non-native grassland.	May	Vernal pool and seasonal wetland habitats such as those at the Nimbus Overlook Vernal Pool Preserve, Mormon Island Preserve and Snowberry Vernal Pool Preserve and Snipes-Pershing Park	Phoenix Vernal Pool Preserve, west of Mississippi Bar area of the SRA.

**Table PL-3. Special-Status Plant Species Occurring in the General Vicinity of the Folsom SRA**

<b>Species</b>	<b>Status/Federal /State/CNPS<sup>1</sup></b>	<b>Habitat Requirements<sup>2</sup></b>	<b>Blooming Period</b>	<b>Habitat on Folsom SRA</b>	<b>Nearest Known Occurrence<sup>3</sup></b>
<i>Orcuttia tenuis</i> Slender Orcutt grass	FT/SE/1B	Vernal pools.	May-Oct	Relatively undisturbed vernal pool habitats such as those at the Nimbus Overlook Vernal Pool Preserve and the Mormon Island Preserve.	Approximately 6 miles from the SRA in the vicinity of Mather AFB.
<i>Orcuttia viscida</i> Sacramento Orcutt grass	FE/SE/1B	Vernal pools. (Endemic to Sacramento County.)	Apr-Jul	Relatively undisturbed vernal pool habitats such as those at the Nimbus Overlook Vernal Pool Preserve and the Mormon Island Preserve.	Phoenix Vernal Pool Preserve, west of Mississippi Bar area of the SRA.
<i>Sagittaria sanfordii</i> Sanford's arrowhead	-/-/1B	Marshes and swamps; in standing or slow-moving, fresh-water ponds and ditches.	May-Oct	Ponds, freshwater marshes and perennial streams throughout Folsom Lake SRA.	Approximately 3.5 miles from the SRA in the Citrus Heights vicinity.

<i>Senecio layneae</i> Layne's ragwort	FT/SR/1B	Chaparral, cismontane woodland; on ultramafic soils; occasionally along streams.	Apr-Jul	Possible suitable habitat in chaparral and woodlands in the Peninsula area. Possible habitat in woodlands elsewhere in the SRA.	Near boundary of Folsom Lake SRA – approximately 0.75 miles south of bridge over S. Fork American River.
<i>Wyethia reticulata</i> El Dorado County mule ears	-/-/1B	Chaparral, cismontane woodland, lower montane coniferous forest; in openings on stony red clay and gabbroic soils. (Endemic to El Dorado County.)	May-Jul	Suitable habitat in chaparral and woodlands in the Peninsula area. Possible habitat in woodlands elsewhere in the SRA.	One known occurrence in the SRA above the South Fork American River, west of Salmon Falls, opposite Indian Springs Creek.

Footnotes:

<sup>1</sup> Status:

FE - Federally-listed as endangered.

FT - Federally-listed as threatened.

SE - State-listed as endangered.

SR - State-listed as rare.

1B - CNPS (California Native Plant Society): Plants rare, threatened or endangered in California and elsewhere.

2 - CNPS: Plants rare, threatened, or endangered in California but more common elsewhere.

3 - CNPS: Plants about which we need more information – a review list.

4 - CNPS: Plants of limited distribution – a watch list.

<sup>2</sup> Sources: CNPS (2001); CNDDB (2002); Hickman (1993)

<sup>3</sup> Source: CNDDB (2002)